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DEC 23 1974

As promised, I am attaching an updated version of the media background kit on Northern Electric, sent you last Spring. It contains the latest definitive data available on the company and should replace the kit you have in your records. We will be revising this kit when changes sufficient to warrant it have taken place.

Yours truly,

Brian A. Kilgore
Director Public Relations West



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the innovators

AR21

Vol. 1, No. 4, September 1974

Expansion abroad:
Northern Electric in Asia

Nedco:
Far-reaching distributor

Amherst:
Gateway to New Scotland



The Innovators



Published monthly by

**Northern Electric
Company, Limited**

1600 Dorchester Blvd. West
Montreal, Quebec H3H 1R1
September 1974 Vol. 1, No. 4

Editor: Dick MacDonald

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Permission to reprint articles is not required,
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Product names, *Contempra*, *Logic*, *Venture I*,
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Printed in Canada

Les *Innovateurs*, édition française, est à votre dis-
position si vous désirez en faire la demande.

Illustrations:

Cover, Pridham's Studio

Amherst, pages 2-5, Cumberland Citizen;

Pridham's Studio

Port Huron, pages 6-7, Burson-Marsteller

Peg locator, page 12, Alan Bowering

Product exhibition, pages 13-14, Bell-Northern
Research

Asia, pages 16-17, Julian Lebensold

Summer students, pages 20-21, Harold

Rosenberg

LD-4, pages 24-25, Fred Ruggles

Walker profile, pages 31-32, David Annesley;

Graetz Bros.

Cover:

The highland strains of bagpipes are heard each
summer at the provincial border between Nova
Scotia (Latin for New Scotland) and New Bruns-
wick on Canada's east coast. This year, piper
Heather Graves has been entertaining visitors. The
border site is two miles from Northern Electric's
plant at Amherst, Nova Scotia.





2 Amherst: Gateway to New Scotland	<i>This Nova Scotia town is the site of Northern Electric's largest Canadian plant east of Montreal. It boasts of having had four native sons in on the founding of a nation.</i>
5 Eastward expansion applauded at Amherst opening	<i>Nova Scotia Premier Gerald Regan officially opened the Amherst plant last month and commended the company for spreading its industrial activities across Canada.</i>
6 And an opening in Michigan, too	<i>The development in the United States of Northern Electric, through its subsidiary Northern Telecom, moved onward last month with the official opening of the plant at Port Huron, Michigan.</i>
9 Overcoming shortages of materials	<i>An animated audio-visual presentation has been produced as one way of drawing attention to the need for conserving manufacturing materials.</i>
10 People, events and ideas	<i>A monthly collection of newsbriefs which have a particular application to Northern Electric.</i>
12 Peg locator: Foolproof problem solver	<i>A new product makes it easier to locate apparatus buried in the ground.</i>
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Inside back cover Stamps honor telecommunications events, people	<i>A pictorial look at how telecommunications have been remembered on postage stamps around the world.</i>

Northern Electric's operations outside its home base of Canada continue to expand. Last month's issue of *The Innovators* carried comprehensive stories on the activities in Ireland; this month we go around the world for a look at the role of the company's offices in Asia.

The distribution subsidiary of Northern Electric, Nedco Ltd., is the subject of a story in this issue. And back-to-back with that story is a profile of Nedco's genial president, Syd Walker.

We institute a Readers' Forum this month, a page of letters which will appear as and when you write us with comments, views or suggestions.

You don't have to be a philatelist to find interest in postage stamps and this month we offer a sampling of stamps issued by various countries to honor facets of telecommunications. Color reproductions of the stamps can be found on the back cover, a departure from our usual practice of running a full-color company advertisement there.

But we do carry a good mix of Northern Electric advertisements in the issue. On page 27, just prior to the feature on Nedco, is one of that company's ads. It's an ad designed to demonstrate the importance of the specialists within the Nedco organization. On page 19, running in conjunction with the story on Asia, is an information ad aimed at the general public in Hong Kong.

People play a part in the advertisement on page 23, too; it was directed at the cable communications trade in Canada. The ad on page 15 was written for newspaper readers in Belleville, Ontario, where Northern Electric has a business communications systems plant. It was written as an expression of thanks for the community's support over the years. And on page 8 is an advertisement which appeared in several Canadian industrial publications as a sales message for the Logic 10 business telephone set. **Q**

Amherst

Gateway to New Scotland

Few communities in Canada can boast of having had four of its sons in on the founding of the nation.

Amherst, a tidy little town of 10,000 in northwestern Nova Scotia, can. Three miles from the New Brunswick border, Amherst, the geographical centre of the Maritime Provinces, was the birthplace of four of the 33 Fathers of Confederation.

They put their signatures to the act which in 1867 created Canada and one of them, later Sir Charles Tupper, served as prime minister for a while. The others, all lawyers, were well-known political figures of the day — Jonathan McCully, Edward Barron Chandler, and Robert Barry Dickey. Schools in Amherst now are named after the early statesmen.

The town's contributions to government service also have included Norman Rogers and Layton Ralston, both wartime ministers of national defence; and E. N. Rhodes and William Pipes, premiers of Nova Scotia.

The entire Amherst region is steeped in history, and it is into this context that Northern Electric has moved with its largest Canadian manufacturing operation east of Montreal. The plant, which began work in February with a staff of 90, was opened officially in August with employment nearing 200. Eventually, full operating strength is expected to be more than 300, making Northern Electric one of the town's prime employers.

Amherst is the mainland gateway to Nova Scotia, situated on the Trans-Canada Highway and main rail lines, and as such greets thousands of tourists each year. Northern Electric's presence there, President Walter Light said at the official opening ceremony last month, "is regarded as a large step forward in our interest in the Atlantic region . . . We intend to be eager participants in the area's social and economic environment."

For Mr. Light, who assumed the



Northern Electric presidency August 1, the Amherst opening was the first official function in his new position. John C. Lobb now is chairman of the board, continuing as chief executive officer.

And for Mr. Light, the Amherst opening was an opportunity to say hello again to the province's premier, Gerald Regan, a long-time friend, who helped the company in selecting a location for the plant.

The Nova Scotia plant produces decorator telephone sets, key set cords, key telephone units, and Logic 10 telephones. Plant Manager G. Willet (Bill) Kilbank and his staff are part of Northern Electric's Business Apparatus

Division based in London, Ontario.

In his office in the 40,000-square-foot plant in Amherst's industrial park at the southwestern edge of town, Mr. Kilbank sees a splendid future for the company in the region. "The reception we have been given by the community as a whole, and the co-operation extended by the town council and the local industrial commission have exceeded all our expectations."

Cumberland County, in which Amherst is located, provides by far the bulk of the work force for the Northern Electric operation.

For the community, Northern Electric's arrival — as with that of other

firms to the industrial park and environs — has been a shot in the arm for the economy. The town has had its ups and downs and only during the past decade has begun to pull itself out of a post-World War II slump.

Amherst is situated on the Chignecto Isthmus, a narrow strip of land connecting New Brunswick and Nova Scotia. A mere 20 miles to the north is Northumberland Strait — across which is Prince Edward Island, where talks of Confederation first were held in 1864 — and a scant half dozen miles south is the Bay of Fundy and its famous high tides.

Before European settlement, the isthmus was a Mic Mac Indian district. Tonge's Island, then known as Ile la Valiere, became capital of Acadia — Nova Scotia and New Brunswick — following settlement by the French, 1604 to 1607. The conflict between the French and British which began in 1613 didn't really end until 1755 with the defeat of the French at Fort Beausejour, five miles distant.

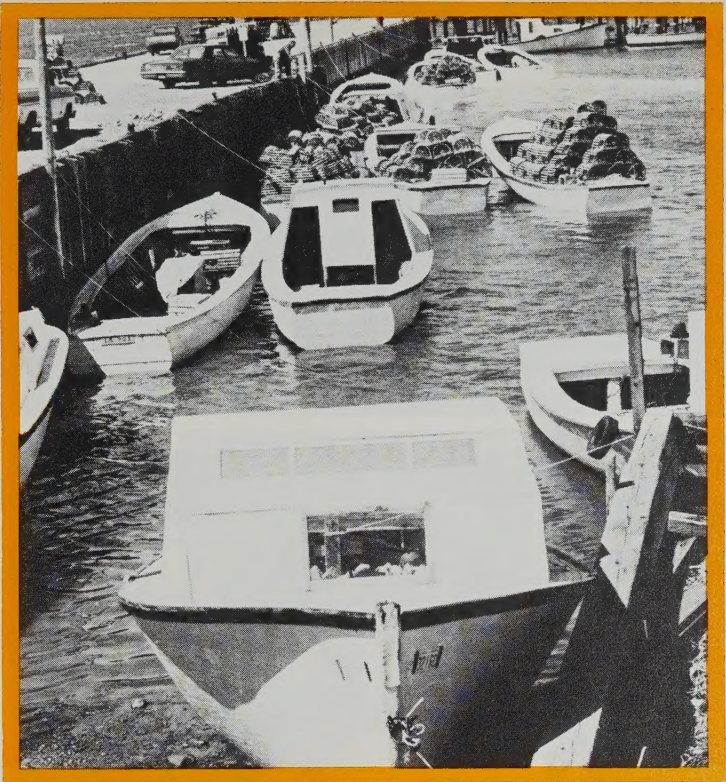
Fort Beausejour, its ramparts and casements, now a National Historic Site and a large museum, is visited by thousands of tourists each year. Nearer Amherst is Fort Lawrence, the old British garrison, three miles away and practically on the Nova Scotia - New Brunswick border.

The remains of the forts face each other across the Tantramar Marshes, reclaimed by the Acadians in the early 1670s. The marshes, vast near-sea-level stretches of grass and hay, are dotted with barns and dikes, some of the dikes dating to the 17th century.

Records show that in 1760, army engineers planned a "new town" near the old Mic Mac settlement on the isthmus, but as the years passed the focus was on Amherst Corners. By 1842, the Corners became the site of the township, retaining the name which came from Lord Geoffrey Amherst, who had led a siege of the now-restored Louisbourg in Cape Breton in 1758.

Amherst was incorporated in 1889, and it was during the next decade that one of the district's dreams began to unfold, albeit unsuccessfully.

Given the narrowness of the land between the Bay of Fundy and Northumberland Strait, and knowing the excessive cost of shipping goods the long way around via Cape Breton Island to the ripe inland markets of Canada and the United States, developers produced an ingenious plan: Construct a ship railway over land — a railroad that could carry ships from body of water to body of water and save hundreds of



Fishing boats tie up in picturesque coves only minutes from Amherst.

miles of travel and many days at sea. This forerunner to the piggyback concept would have been the first of its kind in the world, had it succeeded. Construction went on for three years during the late 1890s but, when the company was within sight of its goal, a government change and depression on

the world market caused bankruptcy. The project was abandoned after \$5 million had been spent. The 17-mile roadbed, running in a straight line through craggy forest and swamp and parallel to the provincial boundary, now makes an ideal hiking trail in summer and recently has been

The Tantramar Marshes are vast expanses of land reclaimed from the high tides of the Bay of Fundy.



used for such winter recreation activities as cross-country skiing and snowmobiling.

The Chignecto ship railroad — periodically there have been other proposals for canals across the isthmus, to no avail — was but an example of the difficult economy with which the Amherst area has had to contend.

Following World War I, with the production of munitions by Robb Engineering (still among the largest employers in the town) and the establishment of a German prisoner-of-war camp, popula-



A new housing development in Amherst.



Inside Northern Electric's plant at Amherst.



Amherst's Highland View Hospital.

tion peaked at 12,000. Then several industries were amalgamated and moved to Central Canada, causing less employment.

Employment rose, though, during World War II when the Canadian Car and Foundry Company established an aircraft assembly plant in Amherst. Veterans may recall the Anson and Mosquito, many of them put together in Nova Scotia.

With the return of peace in 1945, employment dropped and only since 1964, with the creation of the industrial park and a vigorous development thrust, has the population been rising and the average income climbing steadily.

Both Douglas Smith, chairman of the Amherst Area Industrial Commission, and Mayor Norman Mansour are delighted with Northern Electric's establishment in Amherst. They see it as another pollution-free industry for the town, and in this area where clean air has been considered a right, not a privilege, that's something: Most residents like the smell of salt-tinged air.

Apart from Robb Engineering, a division of Dominion Bridge, the town's other main manufacturer and employer is Enamel and Heating Products, with a product range that goes from kitchen appliances to aircraft. Northern Electric has the branch operations of nearly a dozen nationally-known firms as neighbors in the town's industrial park.

Amherst's expansion also is seen in the development of the County Fair shopping mall and several projects in the downtown core. The town has a new hospital and construction of several hundred new homes is progressing swiftly. Residents have access to two community newspapers, the *Daily News* and the *Citizen*, and radio station CKDH, as well as other Maritime media.

Outdoor recreation is important in the scenic Amherst region, liberally dotted with regal oaks, elms and maple trees. Many residents have cottages either on the Northumberland Strait shore or in the neighboring wooded glens, which in springtime invariably yield lots of maple sugar. There's a championship 18-hole golf course within two miles of the town's centre and the Amherst Curling Club is to expand from its existing four lanes. The Amherst Stadium is among the most modern rinks in the Maritimes and a second artificial surface will be built this year to accommodate the growing needs of minor hockey and figure skating programs.

Ten miles to the west, across the Tantramar Marshes, is Sackville, New Brunswick, the home of Mount Allison University. Between the towns is the massive transmitter of the CBC International Service, from which Canada broadcasts to the world.

Sixteen miles south of Amherst is the town of Springhill, the scene of two major mine disasters in 1956 and 1958, which so tragically put that community in the world spotlight.

The disappointments of the past may have instilled the residents with a certain wait-and-see attitude, but there are strong signs that view is fading. Mayor Mansour says people are renewing their self-confidence due in no small part to the number of major companies which are starting operations in Amherst. "People are recognizing that the large plants emerging in their midst are here to stay . . . Our aim of making Amherst a better and more exciting place to live really is coming true."

Any small town that can lay claim to four Fathers of Canadian Confederation shouldn't have too much to worry about.

Richard Andres

Eastward expansion applauded at Amherst opening

The skirl of the bagpipes — the traditional Nova Scotia greeting — and the blazing sun of one of the hottest days of the year welcomed Nova Scotia Premier Gerald A. Regan when he arrived at Amherst to officially open Northern Electric's new 40,000-square-foot telephone assembly plant there.

The premier and his party — which included Nova Scotia Labor Minister Walter Fitzgerald — were escorted into the single-storey plant and later to the blue-and-white draped platform in the plant where the ceremonies were held by piper Duncan McIntyre. (Blue and white are the colors of Nova Scotia and of Northern Electric.)

The Amherst plant is located in the town's industrial park and overlooks the Trans-Canada Highway. It produces the Logic series of business telephone sets; key telephone units (switching units which direct and channel calls to and from such key sets as the Logic), and stylish decorator telephone sets.

In his address to the 250 guests, which included plant employees, Premier Regan credited Amherst's location in the geographic center of the Atlantic Provinces, its close proximity to main rail lines and highways, and an excellent school system as "positive points considered by Northern Electric in choosing the town as the site of its new plant."

Premier Regan, who unveiled a bronze plaque to commemorate the official opening of the plant, congratulated Northern Electric on its leadership in decentralizing its manufacturing operations "into parts of Canada other than Ontario and Quebec. I have always felt that the private sector has a responsibility parallel to that of the national government to support and introduce policies aimed at combatting regional disparities and encouraging the spreading of employment opportunities across the country."



1. Northern Electric's plant at Amherst, Nova Scotia
2. Nova Scotia Premier Gerald Regan, left, with Northern Electric President Walter Light at the official opening of the Amherst plant.
3. Amherst-area residents toured plant facilities during an open house, seen here with guide and company employee Dave Whitton.

It is to the credit of Northern Electric, said Mr. Regan, that it is not only doing this but that, in the case of its location in Amherst, it was done "without financial inducements from federal or provincial governments."

The premier noted that more than 600 new jobs had been created to date by the Amherst industrial park and that a further 400 were expected by the end of 1975. Some 300 jobs had been created

in the community in addition to those at the park. Northern Electric's plant currently employs 200 and the figure is expected to reach 300 when the plant is at maximum.

Northern Electric President Walter Light, who acted as host for the official opening, said "we share with you the emerging feelings of growth in Eastern Canada and we intend to be eager participants in the area's social and economic development . . . we want to grow with you."

Mr. Light told the audience that Northern Electric has been expanding rapidly in Canada and now has operations in the United States and abroad. "While looking for new ways to market our expertise and products, we remain committed to Canada. We subscribe to the idea of Canadians having access to the best equipment that the telecommunications industry can offer and we believe in expanding our operation to all parts of the country while at the same time following a policy of expansion outside Canada.

"We are extremely satisfied with the way our plant in your industrial park has progressed, and we're particularly pleased with the calibre of people who have joined the Northern Electric team."

Amherst Mayor Norman Mansour offered the town's official welcome and the traditional blessing of the plant was performed by Rev. Roger Prentice, chairman of the Amherst Ministerial Association. Guests toured the new facilities prior to a reception and luncheon. As mementos of the opening, they received Irish crystal paperweights specially made for the occasion in Galway, Ireland, by a neighboring plant to the Northern Electric telephone assembly facility there.

Other special guests at the opening included John C. Lobb, chairman of the board and chief executive officer of Northern Electric; Robert C. Scrivener and A. J. de Grandpré, respectively board chairman and president of Bell Canada; W. S. Robertson and G. D. Robb, respectively vice-president of operations and general plant manager of Maritime Telegraph and Telephone Company, Halifax, and Kenneth Cox and G. E. Graham, respectively president and vice-president of New Brunswick Telephone Company of Saint John.

Nearly 1,000 area residents had a first-hand look at the company's manufacturing operations in Amherst during a community open house on August 22, two days after the official opening. □

... and an opening in Michigan, too

There's a gold-plated Contempra telephone set proudly displayed in the Lansing office of Michigan Lieutenant-Governor James H. Brickley. And in Port Huron, Michigan, the state flag now flies on the grounds of Northern Telecom, Inc.'s new telephone assembly plant.

Both the flag and the telephone are mementos of the plant's official opening August 9 — and they represent a major step forward in the rapid growth of Northern Telecom, the U.S. subsidiary of Northern Electric. At a front-lawn ceremony, Lieut. Gov. Brickley exchanged the Michigan state flag for the Contempra telephone set engraved with the plant's dedication date, a gift from Richard F. Doyle, president of Northern Telecom, and A. E. (Ted) Janes, the plant manager.

The new plant, which has been operating since January, 1974, actually is NTI's second site in Port Huron. The first one, no longer in use by NTI, was opened in 1972, and is located behind the new 30,900 square-foot plant — all part of a 4.2 acre site in the city's southeast industrial park sector. The plant employs 158 people; employment is expected to rise to 225 by mid-1975.

Port Huron, a community of 48,000, is strategically located at the mid-point of the St. Lawrence Seaway, directly across the St. Clair River from Sarnia, Ontario. The St. Clair River joins Lake Huron in this section of northeastern Michigan. While the "Blue Water Country," a vast recreational area surrounding the city, has made it a tourist haven, Port Huron also has a strong industrial character.

Area-based industry reaches out easily to touch such major cities as Detroit, Lansing, Chicago, Toledo and Cleveland. The city is a major retailing centre.

In welcoming Northern Telecom's growing presence in Michigan, Lieut. Gov. Brickley said the company "has provided the people of Port Huron with new employment opportunities and the state of Michigan with an outstanding business leader."

Mr. Doyle told a group of more than 50 dignitaries and guests from Port Huron and surrounding communities that Northern Telecom was "delighted"



Northern Telecom's plant at Port Huron, Michigan was declared officially opened when the state's flag was raised by Lieutenant-Governor James H. Brickley, plant manager A. E. Janes, and Richard F. Doyle, president of Northern Telecom, Inc.

Aerial view of Port Huron, Michigan, shows how it is situated at the junction of Lake Huron (left) and the St. Clair River, across which is Sarnia, Ontario, often called the chemical capital of Canada.



to be a part of the community. "Obviously, we like Port Huron and I hope we will continue to be as good neighbors to you in the future as you have been to us in the past."

The official opening was highlighted by a flag-raising ceremony, and was followed by a reception and luncheon at the city's Black River Country Club. At the luncheon, Port Huron Mayor Oliver W. Hanton presented Mr. Doyle and Mr. Janes with the traditional key to the city.

Northern Electric's Quentin R. Ball, group vice-president, subscriber equipment, remarked at how pleased the parent company was with the progress and success of its U.S. manufacturing and marketing arm. A record sales total of \$48.1 million in 1973 has helped Northern Telecom expand to the point where the Boston-based company now has five manufacturing plants, a warehouse in Cincinnati, Ohio, and six sales offices across the United States.

The Port Huron plant's product lines include the Contempra telephone, the Centurion pay telephone, Logic 10 key telephone sets, standard desk models, wall sets, six-button key sets and bell-chime units. Port Huron makes many of the components for these lines, including rotary and push-button dials, ringers, electronic networks and handsets. ❶



Michigan Lieutenant-Governor James H. Brickley, left, on a tour of the Port Huron plant with Richard F. Doyle, president of Northern Telecom.

the beginning

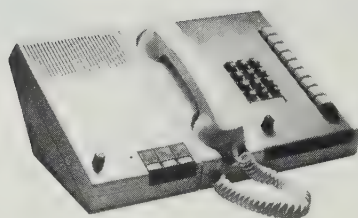


Our new LOGIC* 10 key telephone isn't just a better business phone; it's an exciting new approach to business communications.

LOGIC 10 is the basic building block for a total communications center. It's designed to accommodate a family of plug-in modules—such as the first LOGIC handsfree telephone module shown below. Plug it in to any LOGIC 10 phone and it transmits your voice clearly from anywhere in the room. You'll notice we said "any" LOGIC 10 phone. Part of the beauty of LOGIC is its terrific flexibility. As new modules are introduced, you'll be able to plug them in and out of any LOGIC 10 phone in your office in seconds!

The LOGIC phone gives you more flexibility. LOGIC 10 can handle up to 9 outside lines plus a "hold" function. You can use some of the buttons for outside lines and others for features such as an intercom line.

You can plug in a headset. Sit the unit on your desk or hang it on a wall. Choose one of two base colours then snap in any one of the 5 colour faceplates to harmonize with your decor. LOGIC 10 is available with a rotary dial or you can enjoy the conveniences of push button dialing if available in your area.



LOGIC 10 with the LOGIC handsfree telephone module.
The extra flexibility it gives you today is just **the beginning.**

*Trademark of Northern Electric Company, Limited.

Overcoming shortages of materials

Northern Electric has found a way to offset materials shortage problems in the company's wire and cable division: Introduce a bilingual cartoon character named Robert to all employees, a character who displays effective means of conserving valuable materials.

Robert, a squat fellow bedecked with blue coveralls, red gloves, and a hard hat which features the "NE" logo, is all smiles when shop practices conserve materials and displeased when practices cause waste. So he's been showing employees at Northern Electric's wire and cable plants at Lachine, Quebec, Kingston, Ontario, and Calgary, Alberta what the company is doing to reclaim such materials as plastic, steel, aluminum, textiles, and rubber.

Robert is the star of a 22-minute audio-visual program which has been shown 60 times at Lachine, 20 times at Kingston and twice at Calgary since February. The presentation, which outlines current problems created by shortages, and offers pragmatic solutions to them, is accompanied by a pamphlet on materials conservation. The entire package was conceived by the Lachine plant's materials conservation department.

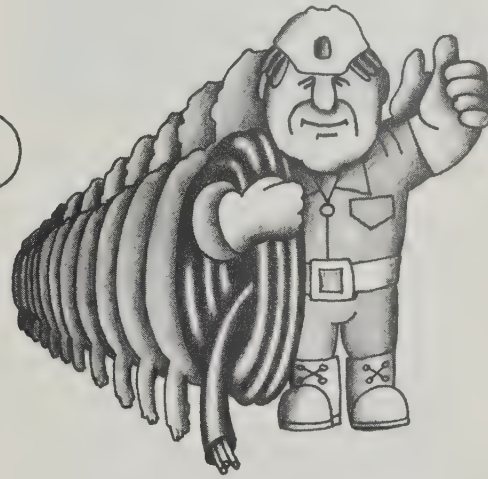
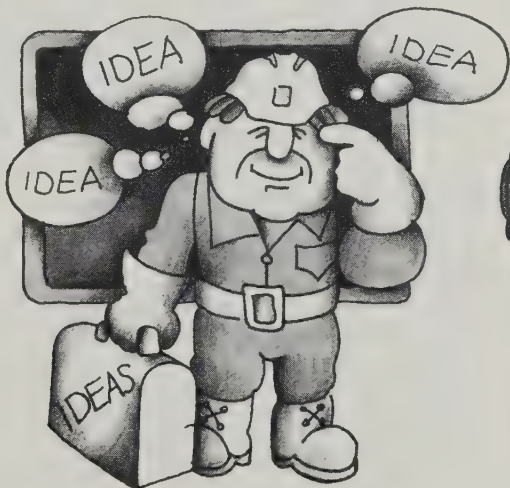
Mr. Schofield says the employee communications vehicle already has produced some impressive results. "Our plants are using raw materials — particularly plastic — much more effectively than in 1973."

He says the program has had two clear objectives: To reduce the creation of waste material by making employees aware of a serious situation; and to recycle unavoidable scrap material for reuse by devising new engineering methods.

Since the beginning of 1974, more than 35,000 pounds per month of poly vinylchloride plastic is being reclaimed, compared to a monthly rate of 11,000 pounds last year. Compound sold or junked per month is down 9,500 pounds from 37,500 in 1973.

The turnaround in polyethylene is even more pronounced. The company now is reclaiming it at the rate of 20,000 pounds per month, approximately 10 times that of 1973. Last year, polyethylene was sold or junked at the rate of 26,500 pounds per month. This year, the rate is 7,700 pounds per month.

Doug Schofield, manager, conservation controls, co-authored the script with Roy McClean, recently reassigned to the new position of director, marketing, at Kingston. The script's French-language version was prepared by Rolie Leduc, Mr. Schofield's assistant.



People, Events & Ideas

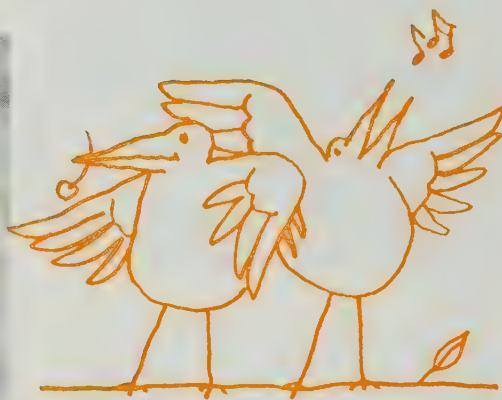
H. W. Lilly has been appointed division general manager, subscriber switching division, in Belleville, Ontario. Mr. Lilly brings an extensive background in engineering to Northern Electric from Bell Canada where he was assistant vice-president, engineering, with Eastern Region. Mr. Lilly joined Bell in Ottawa in 1950, where he began his engineering career. Born in St. John's, Newfoundland, Mr. Lilly attended Memorial University and received his engineering degree at Nova Scotia Technical College, Halifax. His responsibilities include Pulse EPABX equipment and business communications systems, the primary products of the subscriber switching division.



H. W. Lilly

Fred W. Lawrence has been appointed general sales manager of Microsystems International Limited, a Northern Electric subsidiary. The position carries the responsibility of managing all world-wide sales forecasts and sales for all company products, establishing sales policies and developing and implementing plans for profitable growth of sales, directing personnel, and participating in overall company management. Mr. Lawrence formerly was vice-president and general manager of Alta Electronics of Salt Lake City, Utah. He graduated from the Newark College of Engineering and has had extensive experience in field sales and sales management in the semi-conductor industry.

Four drunken birds fed liquor-soaked cocktail cherries by bar patrons were blamed for disrupting airline reservations at the plush Hyatt Regency Hotel in Atlanta, Georgia. Technicians discovered that the shrieking of the birds near the hotel was on the same frequency as that used to instruct a computer to disconnect a telephone line. The problem was corrected, in part, by installing noise-cancelling microphones. Now patrons at the cocktail lounge are being urged not to feed liquor-soaked fruits from fancy drinks to the birds. The birds simply got drunk and chirped up too much noise.



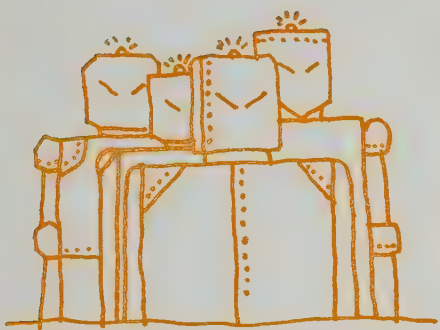
As part of a program of greater civic involvement and support of the arts in areas where Northern Electric has operations, the company will sponsor symphony concerts in several Canadian cities. With Northern Electric funding, the Montreal Symphony Orchestra will present a pair of concerts October 15 and 16, and a second pair February 18 and 19. Two concerts are scheduled by the Winnipeg orchestra October 25 and 26 and the Toronto Symphony will play October 29 and 30, and again February 25 and 26. November 10 and 11 are the dates for the Calgary orchestra to perform and the Regina Symphony plays November 25. Two concerts will be held in Edmonton November 9 and 10. The London, Ontario orchestra will perform February 26.

Expertise at Bell-Northern Research has won the research organization recognition in a new film on industrial design. The film *By Design* was produced by the Ontario Educational Communications Authority and the Office of Design in the Department of Industry, Trade and Commerce, Ottawa. Two designers at Bell-Northern Research, John Tyson, director of design (interpretive branch), designer of the Contempra telephone set, and Jim Bee, manager, industrial design (design development), co-designer of the Contempra, appear in the film. Mr. Bee and Mr. Tyson use the Contempra to illustrate how the design of a product can meet the needs of manufacturer and consumer. The film is being shown, in French and English, at the National Museum of Science and Technology in Ottawa. Also included in the film are shots of a product design display currently on view at the museum. Northern Electric has four products in the exhibition, the most of all 40 participating companies. The exhibition runs until January. (See article on page 13.)



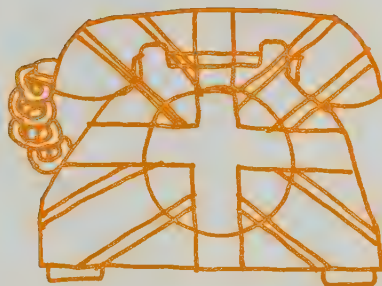
The French firm Telespace will construct the first ground satellite station in South Africa. The decision was announced by Postmaster-General Louis Rive, who said the first antenna will be operative by the end of next year, with the second following within several months. The antennas will hook into the Intelsat IV-A over the Atlantic and the Indian Ocean satellite system to improve the South Africa telecommunications network.

The Industrial Robot Association in Japan has launched a study to assess the long-term potential market for industrial robots in key industries. The study will focus on three industries — automobiles, electrical machinery, and metal equipment. Among the problems to be investigated are technical changes in robot manufacturing, fluctuations in demand for robots, and the impact of robots on the human work force. There now are some 8,000 industrial robots in use in Japan.



A West German government commission is examining the future of communications in that country with particular attention being paid to such systems as two-way cable television, facsimile newspapers, videophones and other new ideas. The commission is to make its report in December, 1975, but there is some chance the date will be advanced as the issues under study are becoming very urgent. Proposals to pipe in facsimile newspapers via cable already have been introduced.

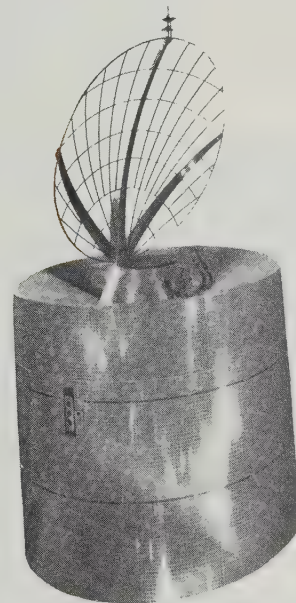
The Canadian Manufacturers' Association has established a metric resources center in Toronto to help ease its members into conversion to the metric system. The center will act as a clearing house for information on business and technical data on the progress of metric conversion programs in Canada, the United States and abroad. In deciding when to convert, the CMA says, it is important to weigh internal data, such as production cycles and write-offs, against external data regarding the marketplace. It is anticipated that Canada will be a predominantly metric country by 1980.



A special report by the London *Times* examined the deteriorating condition of Britain's telephone system. A survey conducted by industrial consultant Ronald Callow discovered that one in every three calls failed to get through in October, 1973. An identical survey conducted in March, 1974 found the failure rate had increased to two out of every three calls. For long distance and overseas calls, the rate was worse. The *Times'* report showed that the Prices Commission and the Post Office Users' National Council are considering another rate increase which would mean that telephone rates have gone up 200 per cent in less than a year. Part of the problem is that operators are understaffed by some 11,000 vacancies out of 243,000 jobs, and that the turnover rate is 50 per cent every year. This means that at any one time a lot of inexperienced operators are working slower than the experienced ones. However, the report said that the most frequent source of user complaints is the fact that the United Kingdom phone bill does not itemize long distance calls, and complaints of overcharging often are expressed.

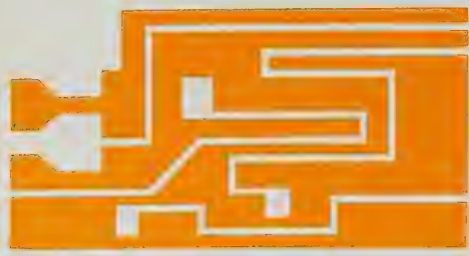
The new town of Tuggeranong, near Canberra, has been chosen as the site for Australia's first cable television system. The system will carry both over-the-air channels and experimental local community programming. Though the Tuggeranong system will be built by the Australian Post Office, private industry apparently is eager to join in cable development. AWA Rediffusion, a joint Australia-Britain company, has expressed an interest in community CATV programming.

Telesat Canada Ltd., owner and operator of Canada's domestic communications satellite system, reported revenue for the first half of 1974 of \$12.3 million, an increase of \$3.9 million from the corresponding period in 1973. Profit rose \$245,000 to \$1.3 million, representing an increase to 21 cents a common share from 17 cents. Telesat Canada is a profit-making corporation established by Parliament to have equity ownership split among the federal government, private interests (such as common carriers) and the public. So far, only the shares for the government and private interests have been issued.



On the Market

Northern Electric shares closed at 21 $\frac{1}{2}$ ¢, for the week ending August 30, after a high of 22 $\frac{3}{4}$ ¢ and a low of 21 $\frac{1}{2}$ ¢, which is a net change of -1 $\frac{1}{4}$ ¢. Shares of Microsystems International Limited, a Northern Electric subsidiary, traded during the same period at a high of 3.85 and a low of 3.25, closing at 3.25, for a net change of -.75. Bell Canada shares showed a net change of - $\frac{1}{2}$ ¢, from a high of 43, to a low of 42 $\frac{1}{4}$ ¢, closing at 42 $\frac{1}{2}$ ¢.



Peg locator: Foolproof problem solver

It's not a prospector's geiger counter, nor a water diviner's forked twig, though it is used for locating subterranean facilities.

For telephone and hydroelectric companies, for contractors, and for water and gas utilities, it comes as a blessing in their search for cables, pipes, valves and other industrial apparatus buried underground.

It's called a peg locator and is a development of Bell-Northern Research. Manufacturing and marketing of the peg locator system now is under way by Northern Electric's Outside Plant Division, located at Amos Street in Lachine, Quebec, and already orders and enquiries are coming in from as far afield as Australia and Europe.

Companies that must bury equipment as a matter of routine — cable, wire, conduit, terminals, transformers and the like — for years have suffered headaches when they've had to go back and locate it. Without elaborate record-keeping or explicit maps, some have been forced to disrupt lawns, streets, parking lots in their search for a lost cable or transformer.

The peg locator system makes the exercise much easier, and considerably less costly.

From now on, a utility company bury-



The peg locator, demonstrated by Bruce McLeod, takes the worry out of finding buried equipment.

ing cable simply implants electronically-responsive pegs at strategic positions along the route. A hand-held locator unit, with a directional radio transmitter and receiver as its key component, can be used to locate the pegs at a later date.

The electronic pegs are matched to a specific frequency in the locator and emit beeping signals if the locator is passed over it above ground.

Each type of company can have its own frequency and thereby is able to identify its own buried pegs. Gene Armiger, director, marketing and sales for Northern Electric's Outside Plant Division, says the system is simple to operate. "An operator walks with the locator

held vertically. Beeps are registered through an electro-acoustical unit in the locator. For more precision — two-inch accuracy at a depth of six feet — the operator need only switch the locator's position to horizontal."

The peg locator system, Mr. Armiger says, is "a foolproof scientific solution to what has been a major problem area. It saves a lot of time both in repairing existing sub-surface equipment and for determining the location of buried plant before new cables, for instance, are placed."

The locator housing is sturdy plastic, virtually maintenance-free and water-resistant, with bright coloring for high visibility. ▢

Northern Electric tops in product exhibition

The electric fork — yes, a battery-powered fork actually has been marketed! — was not especially designed to look pretty. Then again, it wasn't designed to do much of anything functional, which puts it right up there with the motorized skateboard in practicality, and the electric tie rack in necessity.

Canadian design has come a long way since the electric fork, and the best examples currently are on exhibit at Ottawa's National Museum of Science and Technology.

The Office of Design in the Department of Industry, Trade, and Commerce, in co-operation with the National Museum, has created an exhibition of products representing the best of creative design and manufacture. The exhibition is called "Designed to be used" and is open to the public until January, 1975. It contains products — from 40 different Canadian manufacturers — which are available in Canada as well as in many foreign markets around the world.

Of more than 140 products presented to a selection committee for display at the exhibition, only 52 were chosen as "well designed products." Northern Electric leads all participating manufacturers at the exhibition with four products on display, all of them designed

and developed by Bell-Northern Research laboratories in Ottawa.

The exhibit is being staged to give the consumer a better appreciation of the importance of design in the total makeup of a product. It is to show that proper and creative design can mean a great deal in successfully marketing a product. It also is intended to encourage other Canadian manufacturers to profit by making design a major part of their manufacturing considerations.

Broad criteria used to evaluate whether products were "well designed" included: Is the product functional? Does it fulfill the job for which it was intended, dependably and economically? Is the product well made? Is the product suited to human use? Are the controls, shape, weight, and size convenient? Is the product pleasing to the eye? Does the product show some special merit? Does it offer intelligent and economical use of materials or processes? Is it technologically sophisticated?

The exhibit has products from all types of manufacturers, ranging from hockey equipment, to portable toilets, to sailboats, to telephones.

The four Northern Electric products which met these requirements were the Logic family of business telephones, the Centurion coin telephone, the Venture 1

Northern Electric's display area at the designed-to-be-used exhibition in Ottawa's Museum of Science and Technology.



noise-free headset, and the buried peg locator. The design of the Logic line of telephone sets has won critical acclaim around the world for its modular format which allows the plugging-in of additional units, such as a handsfree unit and the Venture 1 headset.

John Tyson, director of design interpretive at Bell-Northern Research and designer of the award-winning Contempra telephone set, points out that "it is up to us to try and match the consumer's need with the manufacturer's need and the distributor's need, and bring about a product that best satisfies all the requirements."

To Mr. Tyson, design really is "problem solving. It is a matter of taking given technology and matching that to the consumer, and to the market place, and to the manufacturer by trying to draw on information from these areas, so that you can develop a product concept that will best meet the requirements of pro-

viding the consumer with added utility. The designer's role is to be a strategic link between the consumer and the technology."

Jim Bee, manager of industrial design (product development), at design interpretive, in BNR, explains that "the consumer is the final user of the product designed . . . It is he who ultimately determines whether the manufacturer continues to produce the same product or reviews the product in light of the consumer's response to it.

"The responsibility of the designer is to listen to the feedback that is generated by the consumer's decision . . . as to whether or not the product is fulfilling his needs and providing him with service and emotional attachment; all the factors that relate to a product and its use."

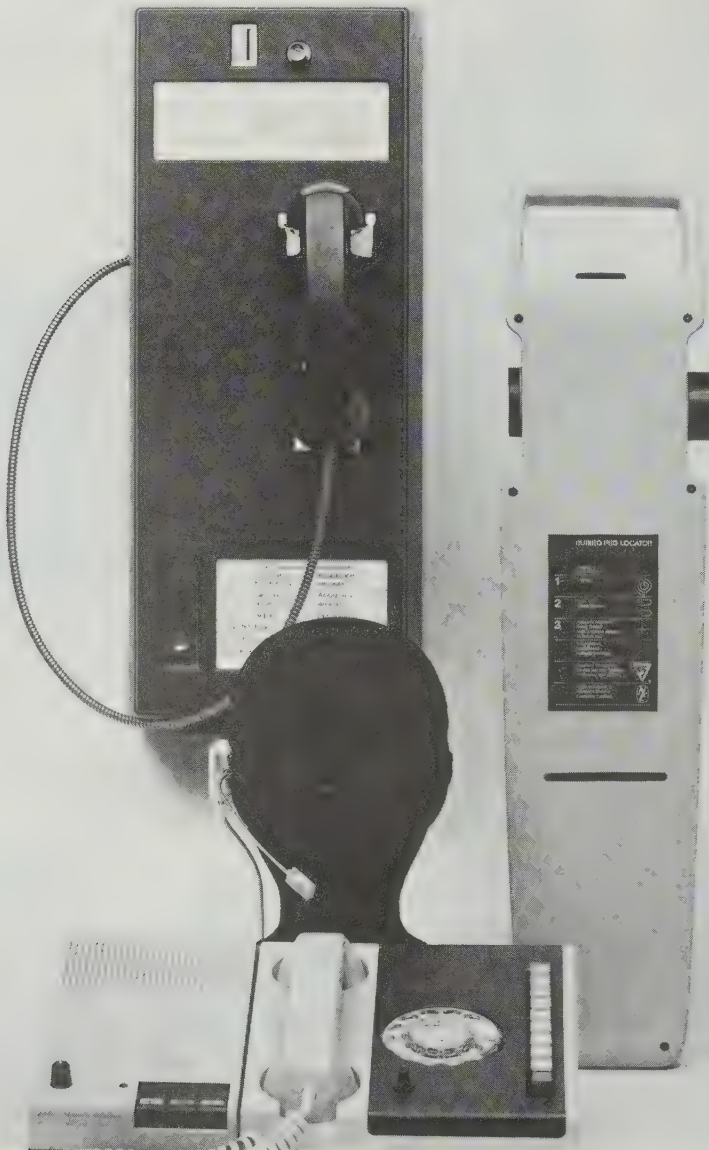
Design in Canada faces the dilemma of small manufacturing volume and colossal distribution costs, according to Mr. Tyson. "Designers in the United States often can start from scratch and develop any kind of product and not be concerned because of the vast manufacturing volume. The Canadian designer has to deal with this problem (costs and small volume) without compromising the effectiveness of the end product."

Robbins Elliot, general director of the office of design in the Department of Industry, Trade and Commerce, puts the problem in perspective. "One has to consider some of the impediments that face secondary manufacturing in Canada. The difficulty of a manufacturer securing venture capital; the difficulty of ensuring that if a product is developed that the market sales potential is sufficiently large in Canada without venturing in a substantial way into the American and offshore market."

Mr. Tyson says for design in Canada to really succeed "it has to become more and more competent in the field of design for export. This implies that Canadian design is going to have to develop a broader awareness of the international marketplace, international consumer patterns, geographical idiosyncrasies within that market segment, and greater understanding of distribution techniques."

Recent history would show that Northern Electric, and Bell-Northern Research at the creative level, have learned the lessons well. Indeed, the expertise developed has been instrumental in helping the company move briskly into international markets with a whole range of effectively-designed products. ▢

The Centurion coin telephone set, the peg locator, the Venture 1 headset, and the Logic telephone unit.



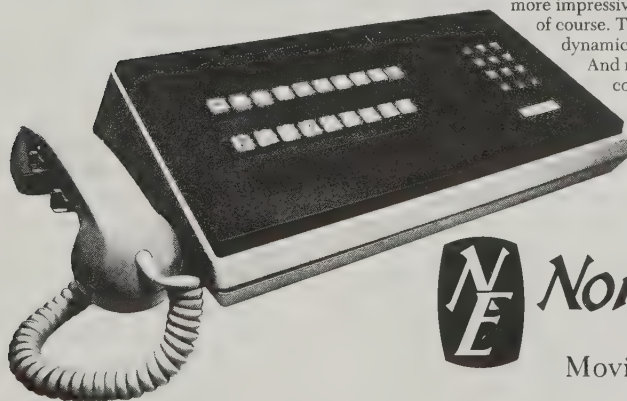


Some of the most sophisticated business telephone systems in the world are made at the corner of Sidney and Wilson

We're talking about systems like our Pulse® electronic Private Automatic Branch Exchange. It's one of the most advanced PABX's ever to make the jump from drawing board to assembly line. And it's been a Belleville show all the way.

Back in 1972, Belleville got the first Pulse model off the ground and shipped units to telephone companies in Canada and the U.S. Where it was snapped up faster than you can say Northern Electric. Now, Belleville's turning out Pulse systems by the hundreds. Along with such other sophisticated products as digital data equipment and key telephone sets.

Which says quite a bit about how far we've come in 27 years. In July '47, when Northern Electric first started manufacturing in Belleville, we employed 59 people. Today, we have 1365 people—doing the kind of work that's made Belleville a vital part of one of the three largest telecommunications manufacturers in North America. And this year will see us breaking more new ground with production of a larger, even more impressive version of Pulse. "Made in Belleville", of course. This city has provided us with the kind of dynamic industrial potential we needed to grow. And right now, we're one of the fastest growing companies in Canada. Thanks for the part you've played.



Northern Electric
COMPANY LIMITED

Moving right along with Belleville

*Trademark of Northern Electric Company, Limited

Northern Electric abroad

Sales and purchasing in the Far East

Asia, particularly the Far East, still has an aura of mystery and romanticism: an irresistible blend that normally would appeal more to travellers seeking new pleasures than businessmen finding new fields to conquer. Yet the Far East is precisely where Northern Electric now is making its presence felt — and for very sound business reasons.

With the formation of Northern Electric (Asia) Limited in August, a trading company has been established with a sales office in Singapore and an executive office in Hong Kong. When the announcement was made, John C. Lobb, chairman of the board and chief executive officer of Northern Electric, said the company's aims were to "penetrate the vast market for telecommunications products that now is developing in eastern Asia."

By that "vast market," Mr. Lobb was referring to 17 countries stretching eastward from India and Pakistan to Japan, a part of the world which encompasses nations ranging in size and character from Fiji to the People's Republic of China. It's a market that now has a total of more than 60 million telephones, with 40 million of them concentrated in Japan. That's compared to a total world telephone population of about 340 million. And although it may seem as small and embryonic as Northern Electric (Asia) Ltd. itself, the market is growing at a rate of from 20 to 25 per cent per year.

The nucleus personnel of Northern Electric (Asia) are Tom Moore, managing director; Ted Pearson, director of purchasing, and Brian Nutter, financial controller, both in Hong Kong; and two young women — Juliana To, the Hong Kong executive office secretary, and Jennifer Chua, her counterpart in Singapore.

Tom Moore left a business of his own in Hawaii to become part of this new team, while Ted Pearson and Brian Nutter have traded Montreal winters for



Hong Kong monsoons to help start up an enterprise "with unbelievably exciting potential," as Mr. Moore puts it.

Northern Electric (Asia) Ltd. comes under the jurisdiction of Northern Electric (International) N.V., a holding company based in Amsterdam. It will be a selling company, handling Northern Electric's line of products manufactured at its plants throughout the world, along with components made by Microsystems International Limited, a Northern Electric Canadian subsidiary which has a plant in Penang, Malaysia. It also will serve as a purchasing agency for a range of components and materials needed by the parent company for its international and domestic operations.

Mr. Moore's function in Singapore contrasts sharply with Mr. Pearson's role in Hong Kong, a contrast as vivid as the difference between the two cities in which they now live. While Hong Kong often is thought of as the New York of Southeast Asia, Singapore's ambience is slightly more orderly and calm.

The Singapore sales office is in Asia's

smallest nation, where 2,250,000 people live on a 225-square-mile expanse of swampy tropical islands. It's a tiny city-state just off the coast of Malaysia, but since it became independent nine years ago, it has swiftly established itself as a thriving industrial centre.

Singapore has some surprising statistics: the second highest standard of living in Asia after Japan, the world's third largest oil processing centre, and a superb harbor which now has become the fourth busiest port in the world. Its facade of crowded, shabby open-front shops are being torn down for towering office buildings, high-rise apartment buildings and shopping centres.

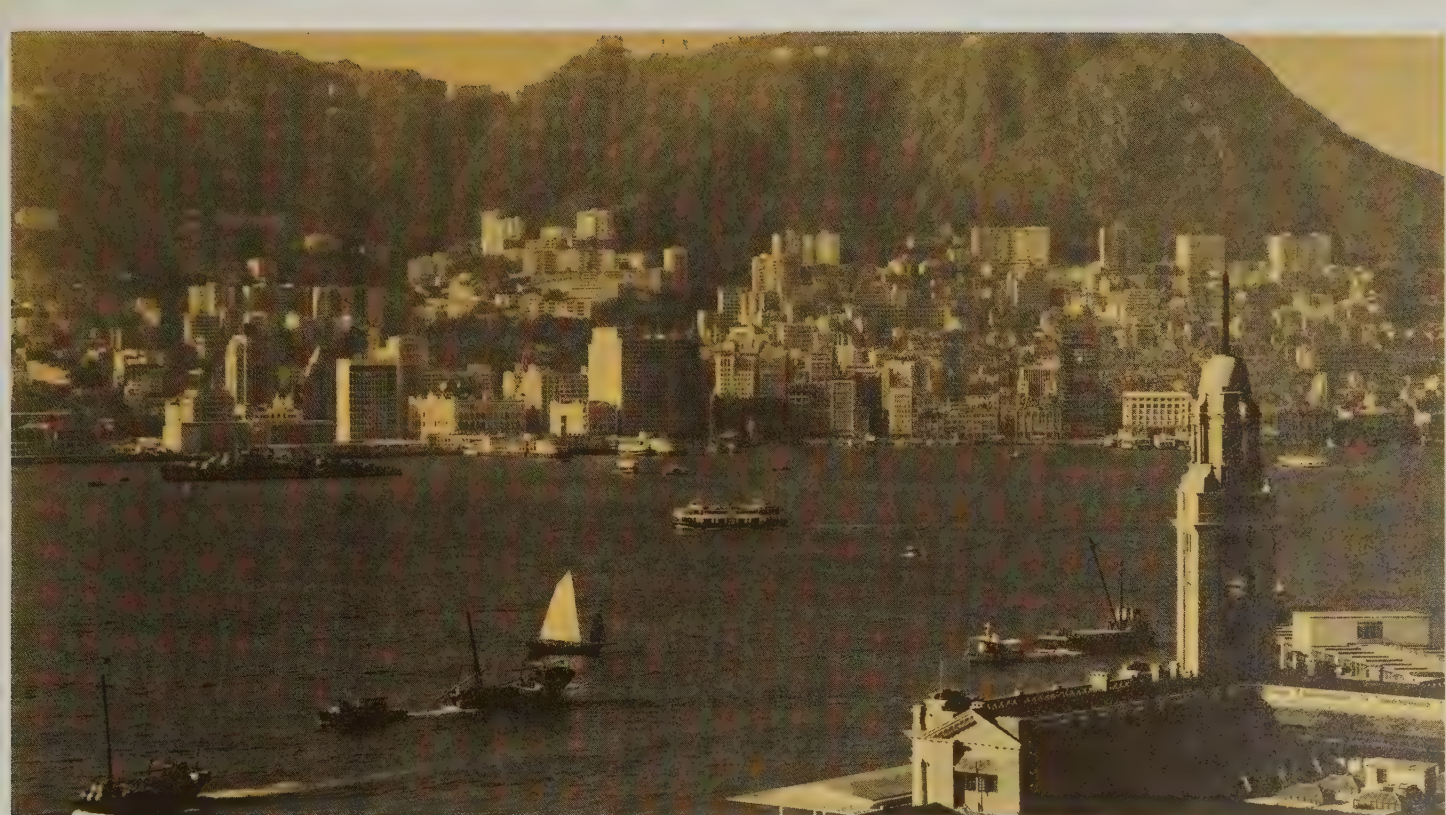
Although it sits virtually on the Equator, Singapore's climate is quite bearable. Usually, it's only about 10 degrees warmer than Honolulu, the city that was home to Mr. Moore for 14 years.

"We have a very efficient government, almost businesslike in its operation, which has made this place an immaculately clean and corruption-free place to work and live. We really have no natural resources except for the people who call it home," Mr. Moore says.

New Jersey-born Mr. Moore prefers to refer to himself as an "American by birth and a Hawaiian by avocation." He began his telecommunications career with New Jersey Bell Telephone Company as a technician, and then went to Korea in the U.S. Army's signal corps, where he developed a liking for the Far East.

Mr. Moore returned briefly to the United States, where he attended the University of Illinois while working as a crossbar switchman for Illinois Bell Telephone Co. In 1960, he went back to the Pacific by joining the Hawaiian Telephone Co., but four years later, went into business for himself. He formed Intellect, Inc., a telecommunications and power systems distributorship.

The company became Northern



Hong Kong harbor with ferry terminal in foreground and City of Victoria and Victoria Peak in background.



Tom Moore, managing director of Northern Electric (Asia) Limited, is based in Singapore.

Electric's distributor for Hawaii, a move that was solidified in 1972 when he signed an agreement with Northern Telecom, Inc., Northern Electric's U.S. subsidiary, to act as a marketing company to sell NTL's products throughout Asia. Intellect had branch offices in Guam and Thailand.

Its assets were sold to Northern Telecom in May, and the former company now is an NTL district office reporting to the Santa Monica, California sales office. Mr. Moore then became a part of Northern Electric (Asia) Ltd., and left two of his three loves in life behind — Hawaii and his own business.

"My first love, my wife and two chil-

dren, have come with me."

They aren't seeing much of their busy husband and father lately, as he has embarked on an ambitious program that calls for setting up a network of distributorships in the 17 countries with which he'll be dealing.

"We must use the distributorship method, because you cannot sell directly to end users in our market. Each country has a government-run telephone company, which deals only through local distributors."

Currently, the Telephone Authority of Singapore is offering Northern Electric's Contempra telephone set as standard equipment.

"Several thousand units now are in use. The newest major hotel here, the Mandarin, has two Digitone Contempras in every room. But there's only one problem: people like the telephones so much that they have been 'borrowing' them," Mr. Moore says.

"Now *that's* what I call product acceptance."

In each country, it is his task to find a local telecommunications dealer who is trusted and respected by that nation's telephone company. He estimates it will take the better part of a year to firmly establish this program and the company's presence as a sales force in the Far East.



Ted Pearson is director of purchasing for Northern Electric (Asia), in Hong Kong.

The major emphasis will be on such station equipment as Contempra telephones, Pulse EPABX units, and the Logic 10 line of business communications apparatus.

In frenetic Hong Kong, Ted Pearson has been working since October to scour eastern Asia for materials and components needed by Northern Electric in its multinational manufacturing operations.

Working with Mr. Pearson on busy Old Bailey Street in the core of the British crown colony is Brian Nutter, the company's financial control officer. Often called the crossroads of the Orient, Hong Kong is comprised of the urbanized Kowloon Peninsula, a hilly extension of the Chinese mainland known as the New Territories, and some 235 islands in the South China Sea including Hong Kong Island, a steep and rugged place where the capital city of Victoria nestles. Altogether, this hot-bed of free enterprise takes up only 400 square miles and has 4.5 million people — most of them jammed into Kowloon and Victoria.

Today, it is the centre of trade and commerce in the Far East, with skyscrapers and smart shops juxtaposed against squatters' shacks and thronging marketplaces. The traditional

rickshaw has given way to the taxi and the double-decker bus. Hong-Kong's magnificent harbor—ranked with San Francisco and Rio de Janeiro as one of the three most perfect natural harbors on earth — is a prestigious port of call for ships of commerce. One still can see junks and sampans, but they, too, are disappearing in a colony where finance (there are 75 major international banks and four stock exchanges) is its lifeblood.

"It really is the entrepreneurial centre of Asia," says Mr. Pearson when describing what it's like to conduct Northern Electric's business there. He says Hong Kong is a place where people are running seven days a week. Although the official working week is five and a half days, "you are always on the move."

"There's no such thing as a neighborhood party. When you go to a cocktail party, it is always on business. Your wives may talk about children, schools and shopping, but you are there as a trader. Business cards are traded as frequently as comments on the weather — which, by the way, is governed largely by typhoons.

"One has to be extremely flexible to deal effectively with people. You cannot afford prejudices. If you have them, you

die commercially. You must be very quick on the uptake just to survive," Mr. Pearson says.

In Asian business, personal contact is vital, particularly with Japanese and Chinese executives, he says, remarking that a man's company often is judged by the man himself. "If you have integrity, then it is assumed that your company does, as well."

For Mr. Pearson, Hong Kong is a homecoming of sorts. He was born in Tientsin, China. In 1946, he left for boarding school in England and then re-joined his family who had returned to Montreal in 1949. After graduating as an engineer from Loyola College in Montreal, Mr. Pearson joined Northern Electric in 1958.

He first worked as an engineer in the Repair and Overhaul Division. After a six-year stint there, he was in materials control, warehousing, pricing, marketing, quality control, and corporate purchasing.

"I kept going from one beachhead job to another every 10 months," Mr. Pearson says. "But now this is by far my most demanding one and will take more time. I'm becoming adjusted to Hong Kong's relentless pace, and my wife and three children like it here as well."

Brian Nutter came to Asia from his post as controller for Northern Electric's Power Cable Division at Lachine, Quebec. He joined the company in 1973 as an analyst and control manager, after having been secretary-treasurer of Alcan Aluminium Limited's subsidiary firm at Lagos, Nigeria.

Right now, Mr. Pearson is surveying Northern Electric's new marketplace for such commodities as plastic moldings, tools, semi-conductor components and wire and cable products. His office primarily is involved in negotiating major contracts, purchasing supplies, and getting to know what Asian technology has to offer.

"As we grow, we probably will increase purchases in this area as primary and secondary sources of supply become better known. Establishing these new sources will be a top priority."

So, Hong Kong and Singapore are the beginnings of another chapter in Northern Electric's rise as an expanding multinational company: the Far East has become a new frontier in the telecommunications equipment manufacturing field — and the company intends on being one of its foremost pioneers.

Who was it that said "never the twain shall meet?"

Lloyd Landa

"Good
Morning,
Northern
Electric"

早晨
Northern
Electric"

"Selamat
Pagi
Northern
Electric"



**With over 26,000 employees and \$612 million (Cdn.)
in sales in 1973 and our new Asian headquarters opening this summer -
Northern Electric says growth in anyone's language.**

Northern Electric is here in Asia and ready for business and we'd like you to know about us.

Hong Kong, Penang, Singapore
Right now, a subsidiary of Northern Electric, Microsystems International Ltd., is manufacturing components in a plant in Penang, Malaysia. Last year we opened a procurement office in Hong Kong, and later this summer this city will be the location for our new Asian company, Northern Electric (Asia) Limited, with a branch office in Singapore.

One of the top three telecommunications manufacturing companies in North America

North America is the world's largest telecommunications market, and the market doubles every decade. So to be in the top three does not "just happen". It takes a lot of hard work. It takes superior product designs and innovations, and a corporate attitude that allows

people and their important ideas to flourish and develop. Last year was the best year in our history — in sales, in profits, and growth.

A complete spectrum of telecommunications products

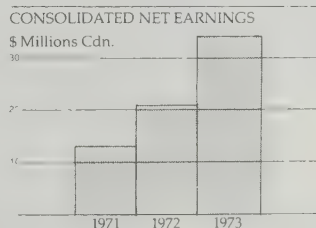
Ranging from components for communications satellites to designer-styled telephones for home use, Northern Electric products cover all aspects of the telecommunications industry. The design and technical excellence of our products has been proven in countries around the world. The uniquely designed Contempra is one of the most sought after telephones in the telecommunications industry, being sold in 37 countries.

1600 people looking into the future

At Northern Electric we believe that research is the key that unlocks tomorrow's doors. That's why we maintain one of North America's largest research

facilities. There, 1600 employees, the majority of which are scientists, engineers and technicians, are involved in the research and development of new products and systems as well as finding ways to make those of today work better and more economically.

Our growth chart tells the story
One good growth chart is worth a thousand words. Because it's the profit picture. And the Northern Electric picture is looking very good.



Northern Electric

COMPANY, LIMITED
Montreal, Canada.

Remember us when you're thinking about telecommunications.

Summer wages help pay for students' tuition

summer is given to children or relatives of the company's employees. Other applications were submitted to the plants independently and were considered, as were all others, on the basis of merit, experience, and education. Positions requiring skilled help often were filled by word-of-mouth, although outside student placement agencies and Canada Manpower sometimes were used.

The largest Northern Electric student

employee concentration was at the telephone apparatus plant in London, Ontario, where 170 students served in capacities ranging from assembly line workers to clerical assistants and equipment testers. The company was London's largest employer of students.

At the company's wire and cable operation in Lachine, Quebec, 97 students worked during the summer months, while Montreal's Relay and Electronics Division employed 73.

Chances are you've seen the eager face of a student hunting around for a summer job, and that in itself is pretty normal. According to Canada Manpower, more than one million students sought employment this summer — an increase of almost 74,000 over last year, and of those looking 85-90 per cent were expected to find work of one kind or another.

Northern Electric's operations in Canada employed some 700 students this summer, representing one of the largest industrial concentrations of student summer employment.

The company received more than 2,000 applications for temporary employment from students and hired roughly 30 per cent. The figure is nearly double that of last year, and represents an expenditure of more than \$1 million by the company in salaries and benefits for student employees.

First priority in hiring students for the



1



2



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1. Dave McIntyre, of the University of New Brunswick, Fredericton, was a gardener's assistant at Northern Electric's Wire and Cable Division plant in Lachine, Quebec.

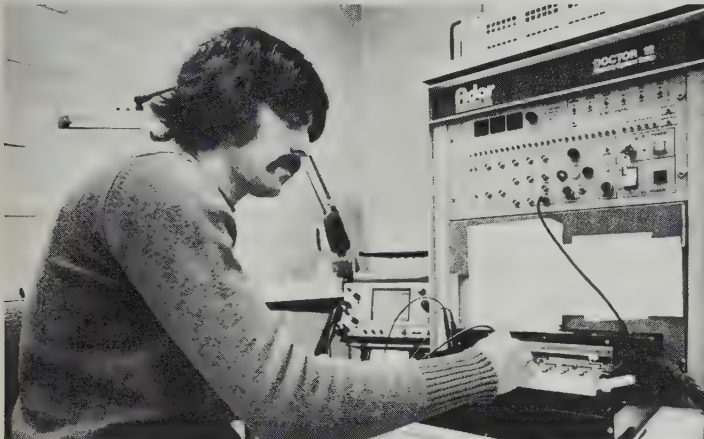
2. Joyce McFarlane, of Hamilton's McMaster University, spent the summer as a welding machine operator at the Relay and Electronics Division, Lachine.

3. Luc Monette, of the University of Montreal, worked in relay and electronics on printed circuit boards.

Numbers varied with plant size and specialization of duties but all Northern Electric operations used some student help, from a minimum of five at the Montreal switching operation to the 170 in London.

Depending on individual plant policy, some students worked through the standard vacation period from July 15 - July 29, while others had the option of not working.

Although in the past only a small percentage of those who worked during the summer returned to Northern Electric as full-time employees, a stepped-up college recruiting program is expected to draw greater numbers of them back. George Meaney, director of managerial and professional staffing, says "we hope that our summer



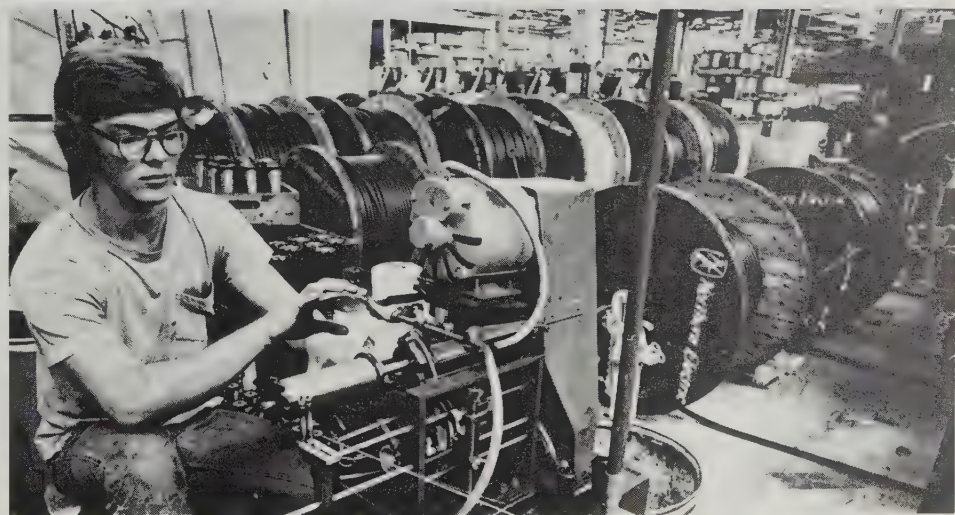
employment program has been a personally rewarding experience and that it has given them an appreciation of the many talented people that we have and will require for our future growth."

All students employed by the company enjoyed full union benefits during the summer months.

G. D. Metcalfe, manager of manpower planning, staffing, and development, at the London plant, says "we found that the students worked out very well, and that our managers were pleased with the work they did."

The same positive response came from the other operations employing students for the summer. The large number of applications for positions was due in large part "to an increased public awareness of the opportunities and working conditions at Northern Electric," Mr. Metcalfe explains.

While most students employed were university under-graduates, community college and high school students also were taken on. With continued company growth, the number of students employed for the summer is forecast to rise to more than 1,000 by 1978. ▀



4. Daryl Kiperchuk, of Montreal's Loyola College, was an insulator of marine cable in Lachine.
5. Serge Leclaire, of the University of Montreal, tested printed circuit boards in relay and electronics.
6. Marion Schluter, a student at Montreal's Dawson College, performed general library duties at the wire and cable plant.
7. Brennan Ouimet, also of Dawson College, spent his summer break at the Lachine plant, here seen rewinding bronze wire for shielding in marine cable.

Readers' forum



Volume 1, Number 2 of *The Innovators* has just come across my desk and I hasten to congratulate you on an attractive and interesting publication. I wish you every success with it.

Ken Kelly
Director, Information Services
Ministry of State for
Science and Technology
Ottawa

Thank you for sending me a copy of the August issue, which contained the article on the Bramalea soccer leagues playing on Northern Electric property.

May I at this time express my sincere appreciation to the Northern Electric people who live in Bramalea for their outstanding contribution to the community. It is indeed a pleasure to travel out to Bramalea and see the many, many children playing soccer in the area provided by Northern Electric.

J. E. Archdekin
Mayor
City of Brampton, Ontario

I would like to compliment you on the excellence of the articles in the June issue. I was especially impressed with your Essay-of-the-Month, by Dr. Hans Selye, so much so that I am going to impose upon your generosity by asking you to send a copy of this issue to several friends.

James N. Allan, MPP
Legislative Assembly
Toronto

Congratulations on your new magazine. It's a handsome and useful book.

A. J. Patterson
Financial Times of Canada
Montreal

Just a note of congratulations for an informative and exciting magazine. The publication, together with the other general information books on Northern Electric, have created quite a stir of interest here.

William H. Mantle
Chief, Communications Division
Office of Design
Department of Industry, Trade and Commerce
Ottawa

Your magazine looks great. I'd appreciate receiving a copy of Volume 1, Number 1 so my file starts from Day One.

A. Ian Reid
Editor
The Electronics Communicator
Scarborough, Ontario

Although I do not work for Northern Electric, I have friends on your assembly lines, which is how I come to read your magazine. I thought you might like to know how a worker reads you.

When you wrote about Mr. Poudrier, (Camille Poudrier, a retired Innovator returns) in the June issue, you made some reference to the supposed importance of the man on the job, and asked if he gets proper recognition for his work. You wrote: "The ever-essential machine operator."

So far, you've written mostly about research and markets, and it is very interesting because we see why products get to be what they are and how they get around the world. It's interesting also to read about the people who run the company. And the plants abroad.

But it would be even better, from my point of view, if we were to learn more about the people who work in them. Are their assembly lines, their work speed, the same as ours? What's it like for the girls who work in Turkey?

Also, sometimes I read in newspapers about research on jobs that are monotonous and how some people find ways of making them more interesting. And what about flexible hours in factories? Are you going to tell us about those kinds of developments and if your industry is going to innovate about things like that?

I'm writing because I've enjoyed the magazine and it is very beautiful to look at. Maybe if you print my letter others will write about their own views.

Jacqueline Basuk
Montreal

I write in response to your request to "let us know what you think". First, as to your philosophy based on Graham Spry's premise that "Without communication there is no society," I am a believer.

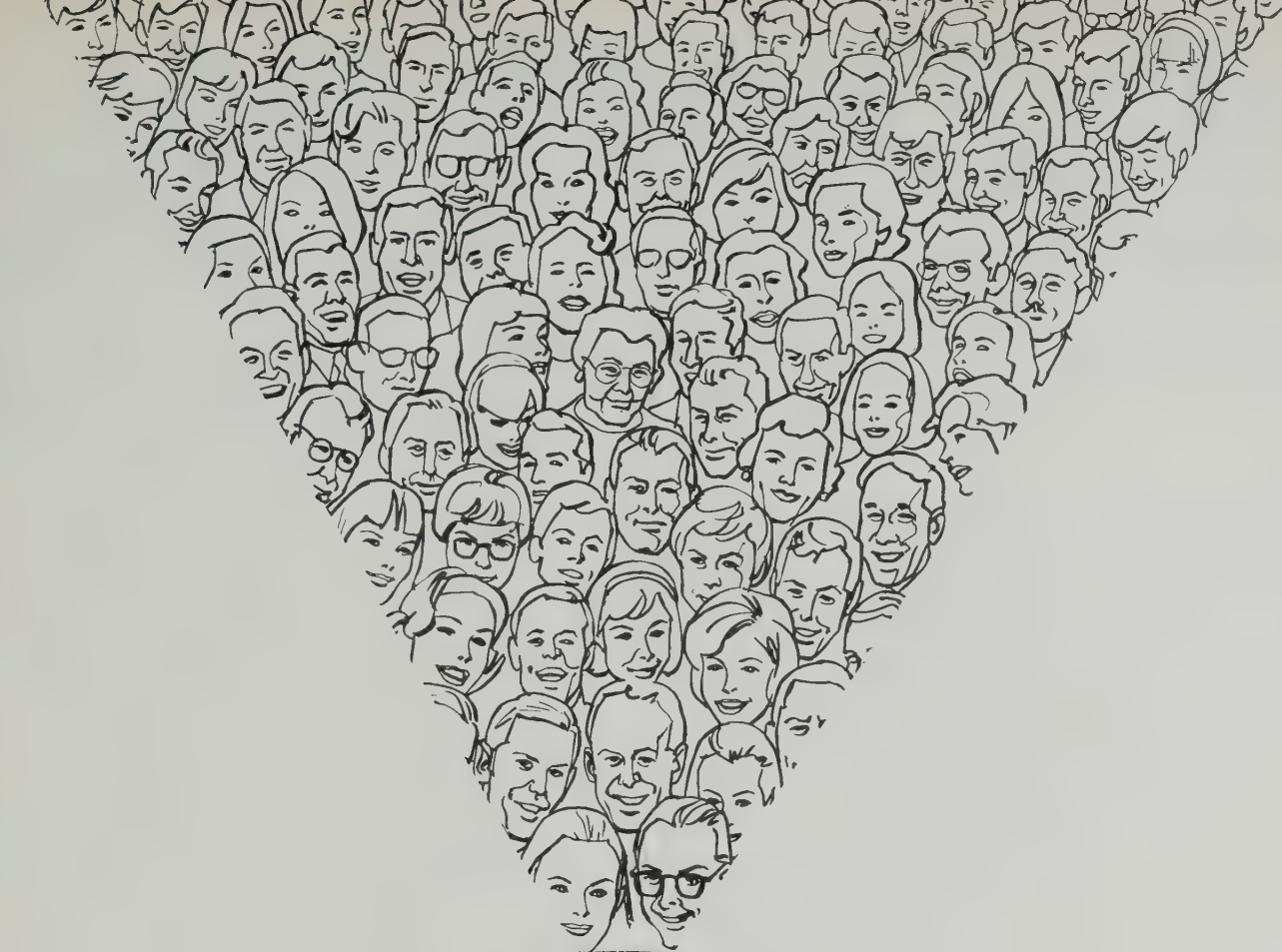
Next, regarding your publication's name, I think it well chosen and look forward to finding in its columns not only stories about Northern Electric's telecommunications innovations but also about our company's innovating people.

Our *Northern News* was a much-appreciated window through which we retired Pioneers could look in on the activities of Northern Electric and our still-active fellow employees.

The *News* will not be so much missed by that minority group of its readers to which I belong if its innovating successor can find space in its pages for a little window to take the place of the one now gone.

Ernest S. Kelsey
Ottawa

(*The Innovators* is being complemented by a series of plant publications and by the Northern Electric *Pioneer*, a quarterly publication for members of the Telephone Pioneers. Ed.)



We have
more than
2400 people
devoted
to cable.

 **Northern Electric**
COMPANY, LIMITED

At Northern Electric we're big on cable. We've spent 75 years developing new and better cable, more efficient quality control systems and improved methods of distribution and delivery. We've invested \$75,000,000 in modern plant machinery and 1,500,000 square feet in plant space. Through NEDCO, we've set up sales and service outlets in 50 cities stretching from Halifax to Vancouver. And we can deliver everything from drop wire to transmission cable.

We're competitive. And our people like doing business with you.

LD-4 cable snakes across Central Canada

By 1976, a ribbon of coaxial cable extending from Montreal to Toronto will transmit a wide range of telecommunication and data transmission services to more than six million Canadians.

That cable — more than 350 miles long — is the spine of the LD-4 digital telecommunications network, a multi-million dollar joint project of Northern Electric, Bell-Northern Research and Bell Canada. The unique digital system, the first of its kind in Canada, will allow a variety of communications, from telephone conversations to computer-type

data, to be transmitted along the same network.

The digital long-haul system, owned and operated by Bell Canada, differs from conventional "analog" networks in that analog signals are sampled and coded into a series of pulses. These pulses, transmitted along a cable at a rate of 274 megabits (million pulses per second), are then retimed, reshaped, and regenerated at approximately 6,000-foot intervals by repeater equipment. The LD-4 system provides both a higher channel capacity and a more economical means of transmitting data.



The LD-4 system uses a 12-tube coaxial cable designed specifically for digital pulse transmission, and will be capable of simultaneously transmitting about 20,000 telephone conversations between Montreal and Toronto.

The network has a series of major repeater stations and access points to the system, located at Montreal, Ottawa, and Toronto, as well as at four other Ontario towns.

The project began in 1968 at Northern Electric's research laboratories (now Bell-Northern Research) and the first cables were installed in 1972. Installers

have been using a specially-designed plow, teamed with a bulldozer, which simultaneously buries cable and shield wire where terrain permits. Other sections of the cable are buried in trenches no less than four feet deep.

The entire operation has been divided into three phases. Two of them, the networks between Smith Falls and Ottawa, and Ottawa to Montreal, have been almost completed, and will be in service in 1975. The LD-4 cable has been placed; terminal and manhole equipment now is being installed.

The third and final phase, linking Ot-

tawa and Toronto, will be completed by 1975 with full service expected in 1976.

To date, Northern Electric's wire and cable plant at Lachine, Quebec, has manufactured more than a million feet of coaxial cable, and will produce another 550,000 feet to complete the system.

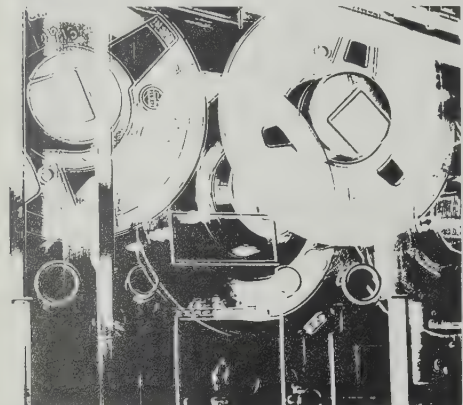
The system's transmission components are being fabricated at the company's transmission division plants located at Shearer Street, Montreal, and Lucerne, Quebec, five miles east of Ottawa. ▀

The new LD-4 coaxial cable is being laid from Montreal to Ottawa, then on to Toronto.





Computers have more uses than meet the eye. Compu-Serv Network in Columbus, Ohio will use heat discharged from seven giant computer systems to provide heat for the firm's new 30,000-square-foot administration building. The new building will need up to 130,000 BTUs per hour and 120,000 of these will be provided by heat from the computer centre, the rest coming from a back-up generator. At the present time, a 90-ton air conditioning system is used to discharge the heat into the outside air.

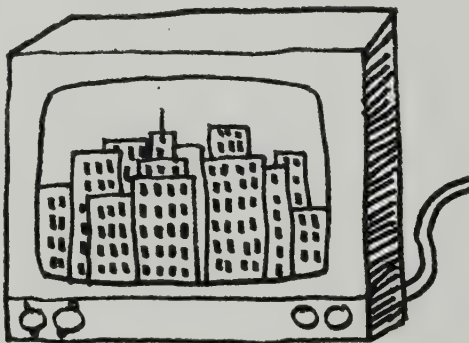


Brazil has set up a new "urgent" telegram system called "telexogram." Because of a generally poor long-distance telephone network, telegrams have been the traditional means of inter-city communication in Brazil. The telexograms will cut the 30 hours a telegram took to go from Rio de Janeiro to Sao Paulo to three to six hours. Telegrams from the interior which took days to transmit will be delivered in six to 10 hours.

The West German Parliament set aside \$47.5 million for improvement of electronic components, optics and measuring and analysis technology. A bill also has been approved which allots \$133 million for basic research and development work in the computer field; total funds for electronic data processing and documentation development jumped more than \$30 million from 1973 to 1974. No increase has been noted for aerospace research, however, continuing the European trend toward co-operation in this area.

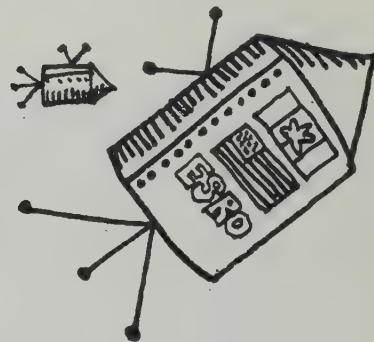


The University of Southern California Annenberg School of Communications is about one-third along on a major study of potential uses of cable television for municipal governments. Researchers are meeting with officials from 10 cities to determine their reactions and perceived problems. So far, they have found local officials less interested in cable TV per se than in the broader concept of using communications technology to deliver city services to residents.



Direct distance dialing has been inaugurated between Lisbon and France-Monaco. The installation of the system is seen as another break with Portugal's isolationist past. There still are some bugs on the Portuguese side, however, as only the more modern Lisbon telephone exchanges will be able to use the new system. The Lisbon government has called the DDD system another step forward toward a united Europe.

Canada and the European Space Research Organization have signed an agreement about the launching of an air navigation satellite in 1977 (Aerostat). The United States, Canada and ESRO initially will place two satellites in orbit over the Atlantic Ocean. Only France, of the 10 nations which belong to ESRO, has refused to sign. France says it will sign only if it is understood that this does not mean any automatic commitment of funds for Aerosat. The program could be world-wide by the 1980s.



The Mexican government is spending \$200 million to install a communications infrastructure for reaching the most isolated parts of the country by 1976. Radio telephone service and television transmitters will go out to some 22,000 village communes which heretofore have been isolated from Mexican life. Among the government's objectives is encouraging the use of the Spanish language by all native peoples.



the "know-it-alls"

They're specialists in electrical and mechanical parts and supplies, but specialists with a DIFFERENCE . . .

THEY'RE THE NEDCO PEOPLE . . . The counterman, technical specialist and sales representative.

They're the customers' side of Canada's newest, largest and most progressive electrical and mechanical supply company.

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Most importantly . . . they're part of the NEDCO TEAM . . . NEDCO . . . a company small enough to be concerned with your tiniest problem . . . big enough to deal quickly with your largest.

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the difference is the



people

Nedco

distributes

from Bonavista

In a country as vast as Canada, where development of natural resources is taking place on a gigantic scale in such sparsely-populated places as the James Bay area of Quebec, the Nelson River basin of Manitoba, and the tar-sand regions of Alberta, efficient distribution of electrical and industrial equipment is crucially important.

A few decades ago the main concern of industrial development was production, but this emphasis has shifted to distribution, as manufacturers have been more and more concerned with the problem of getting their goods from the factory to the consumer at the least possible cost. Direct selling is all right when selling is easy and highly profitable, but as competition increases, efficiency in distribution becomes a major issue.

No wonder then that a distribution company which can provide quality products and services, no matter where or when, quickly achieves solid success. That, in fact, is the Nedco story.

A helicopter flying over the vast James Bay hydro-electric project carries two Nedco sales managers.

Two trailers set up in 1973 on the fringe of the forest at Fort McMurray, near the Athabaska tar sands, shelter a Nedco depot of 3,000 items and the living quarters of the local representative. (His offices now are located in a permanent building.)

A Nedco "branch office" in northern British Columbia covers an area stretching from Prince George to Dawson Creek and from Prince Rupert to Williams Lake, which means, roughly 140,000 square miles.

The Nedco national warehouse in Toronto occupies 84,000 square feet, stocking over 15,000 items.

From Whitehorse in the Yukon and Yellowknife in the Northwest Territories, to Sydney, Nova Scotia, Nedco representatives service municipalities large and small for their many needs in

maintenance and electrical equipment.

The largest proportion of sales are among contractors, manufacturers, power utilities, telephone companies, mines, followed by government and various institutions, in that order.

Nedco supplies saw-mills and lumber camps, mines, mills, (such as Inco, in Sudbury), oil fields and hydro-electric developments. Where quality products are needed, backed by quality services, there will be a Nedco representative.

Where does such expertise come from?

Nedco Ltd. officially was born in July, 1972 as a wholly-owned subsidiary of Northern Electric. In everything but name, it already had acquired much experience as the distribution division of Northern Electric. In fact, some Nedco employees have 35 years' service and more.

The Northern Electric distribution operations date back some 60 years, and were based very much on the same principles as today except for the fact that the present range of products is much larger, including telecommunications and data terminal equipment.

However, as an integrated part of the whole Northern Electric organization it was difficult to isolate results in detail. As Northern Electric grew, with the tremendous developments in telecommunications, it seemed wise to give the distribution division more autonomy and self-management to handle its own destiny. The move resulted in greater financial flexibility and better profitability control.

W. F. Sydney Walker, president of Nedco Ltd., explains that much was done to improve the distribution facilities and the number of products available. Of course, comments Mr. Walker, there are always some people who resist change, but these problems have been overcome and a very effective sales force has been the result.

Vast industrial and construction projects rely on Nedco and Nedco people to provide materials and equipment. For instance, Nedco's St. Hubert Branch, south of Montreal, has just received a very substantial contract to supply Marine Industries, in Sorel, with marine cables for six container ships being built for a Greek line. In a very different category, Nedco will supply the underground cable to light the autoroute to Mirabel, the new international jet airport, north of Montreal. It will be supplying most of the control cables and fibre ducts for the expansion of the Metro, Montreal's subway system. In another major metropolis, Nedco has obtained the contract for all the lighting apparatus which will be used in the Royal Bank Complex being built in downtown Toronto.

Such achievements don't come easily and require much careful planning and managing.

"The name of our game is service," says Leslie J. Payne, vice-president, administration, a tall, affable man, who makes his point with force and ease, using the right word at the right time. He has held his present position since the company's formation two years ago, but had been with the parent organization since 1948. Every facet of the business is familiar to him. Building up a network of distribution centers has been a matter of carefully bringing together a knowledgeable sales force and a wide selection of quality products.

"We face very serious competition," explains Mr. Payne. "There are 3,000 companies in this field. So it's a question of having the best products, where they are needed, when they are needed."

In tools alone, Nedco Ltd. carries more than 5,000 kinds, including machinery, but it also supplies all types of adhesive tapes, abrasives, security products, electrical controls, air conditioners, generators, heaters, lubricants,

to Vancouver Island

wire and cable — in brief, most of the movable equipment which might be needed in industrial developments, oil fields, forestry, mines or municipal maintenance.

An important part of the company's success stems from its ability to provide post-sale counsel and servicing, so that the most efficient use of the products is assured.

Nedco sales people have excellent knowledge of their products and their clients' needs, but should more advice be required they can call on experts from the company staff.

That's why the company slogan reads: "The difference is the Nedco people." The slogan was coined by Jean-Paul Gailloux, a veteran of 35 years in the business. He is now located in Quebec City, representing

Nedco Ltd. to local customers and government services. A man of rich experience and immense vitality, Mr. Gailloux takes great pride in the achievements of the Nedco staff, numbering approximately 800, from coast to coast, and of whom 30 per cent are women.

"In 1967," says Mr. Gailloux, "we promoted the first girls to our inside sales desk in Three Rivers. The inside sales representative in Sudbury, servicing the giant Inco, is a girl and there are many other women in service groups. We're hoping to have some girls 'on the road' soon, and in all areas of our business."

Being a "people enterprise" requires special management skills and planning. Mr. Payne points out that productivity, as well as profitability, is more dif-

ficult to control in an industry essentially based on distribution and service, resting chiefly on human factors.

While productivity is constantly improved through incentive plans and motivation, there are nevertheless more intangible factors to be contended with than in regulating the mechanical functions of an assembly line.

Because people are such a cornerstone of Nedco's achievements, much thought and effort are expended on personnel. "We're in the process of defining our man-power planning program," says Mr. Payne, "with a questionnaire going out to all our personnel to help determine aptitudes and orientations, expectations and ambitions. This will tie in with our performance appraisal program which is undertaken each six months. From all of this input comes our

The Nedco distribution and sales network stretches from Newfoundland, in eastern Canada, to Vancouver Island in the west.





NEDCO



career planning program."

In summary, here are a few more facts which round out the Nedco picture:

Nedco Ltd. relies on some 250 of the country's major manufacturers for a wide variety of industrial and electrical products.

It ranks among the 80 largest companies in Canada.

It has 55 outlets in 42 cities and towns across the country, including every capital city. Each branch operates as a profit center, with total responsibility for its own profit and loss position.

More than 30 of its 55 outlets are fully stocked with all available items.

The national distribution center is in Toronto; the head office in Montreal, on Paré Street, where, besides head-

quarters offices, the large building houses the Quebec Region offices and the Montreal Branch with its large warehouse.


Nedco's catalogues list more than one million items in 15,000 different product categories. Northern Electric accounts for only 20 per cent of this inventory, mostly in wire and cable.

Nedco also has a fully-staffed credit department. It works with customers on a national basis and makes buying from Nedco Ltd. a simple proposition.

As part of the growth and development of Nedco, a new company was acquired recently to improve distribution facilities in Ontario. Zenith Electric Supply Limited, of Toronto, was bought in September, 1973, and complements Nedco's sales to customers in Ontario.

With the acquisition of Zenith came

its subsidiary, Zentronics Ltd., of Toronto and other Ontario locations, which is a distributor specializing in industrial electronic products, a new field for Nedco. An additional Zentronics office has been opened in Montreal and the company plans to reach into the Ottawa region and, in the near future, to the West Coast.

Large or small, Nedco's clients, whether located in the metropolis or in far-flung outposts of new developments, all are assured of the same rapid and efficient service. That is why Nedco vice-president Payne confidently states: "Sure, there is stiff competition. However, we think we have the products and service but most important, the people, to meet it." 

Danielle Dionne



"I spent a lot of time with the Indians," he says. "They taught me their language (Nishga). They also taught me how to hunt and fish" — skills he never has lost. They also gave him an Indian name, long since forgotten, and a small totem pole, which he still has, carved just for him by a man who was 111 years old — and blind.

Hunting, fishing and the sea dominated his early years. By the time he was 16 he had his coastal captain's papers and was working hard at the cannery during summer vacations. School for him was Shawnigan on Van-

was 1931 and the Depression was at its height — it looked as if young Syd Walker's university education was over and done with. Thereafter followed a series of nothing jobs — in a stockbroker's office, in an iron foundry, selling adding machines, and then cash registers — until in 1934, Neptune, god of the oceans, looked kindly on him.

He was working on a seine (a type of fishing boat) at the time when they suddenly hit a huge run of salmon. The going rate for fish caught was two cents apiece and he made \$1,500, enough to give him another crack at the University

Nedco's president grew up in the wilds

He has the heart of a sailor and the brain of a businessman. Two months before his 60th birthday he took a brand new job and made a smashing success of it — but he sometimes still wonders if he shouldn't have made the navy his career.

He gets up at 5.30 every morning and cooks black Alaska cod for breakfast, smokes two packs a day, plays a mean game of pocker with Northern Electric cronies every other pay day, speaks Nishga (Nishga?) fluently.

Well, enough of the guessing game, he's Syd Walker, president of Nedco Ltd.

He's done a lot of living in his 61 years, suffered a couple of tragedies that would set most people right back on their heels, and come through it all as a quiet, genial, matter-of-fact man . . . with his enthusiasm still intact.

He was born in British Columbia a year before the outbreak of World War I and had a slightly crazy childhood. "My father was manager of a salmon cannery up near the Alaska border," he recalls, "so we spent the six summer months up there and the rest of the year in Vancouver. It meant we (three sisters) never got a full year's schooling, so we took the headmaster of our school up with us for the summer. We also took a cow because we couldn't get fresh milk . . . It was a bit of a travelling circus, come to think of it."

Mr. Walker looks back to those years with great warmth, and regrets that his own sons didn't have the benefit of growing up "in the wilds."



couver Island, considered one of the best in Canada, and it was there he suffered his first setback, a "smashed-up" arm, to use his expression, the result of a particularly rough rugby game. It left him with a permanent crook in the elbow and two fingers with little or no feeling in them.

At 17 he went to the University of British Columbia and, despite good grades all through his high school years, was bounced at the end of the first term.

"I was a complete flop," he admits in his usual honest manner. "I think it was because I was too young, too disinterested maybe . . ."

Since money was tight — the year

of British Columbia. Second time 'round, everything went well and he graduated with a commerce degree in 1937, at the age of 24.

Jobs were hard to find, and the only offer he got was as a storekeeper at a logging camp. He didn't expect much from it, and certainly not the pretty young nurse, Kathleen, who worked in the nearby missionary hospital.

In 1940, they both quit their jobs and headed back to Vancouver for an early winter wedding. Mr. Walker got a job as a warehouse packer with Northern Electric, but his heart was at sea, and he's the first to say it. "All the time I was trying desperately to get into the navy," he says. "I didn't want to be a footslogger

in the army and I didn't want to fly . . . " Finally, he made it and on VE Day, 1945, he was first lieutenant on a frigate in the North Atlantic.

After the war, he returned to Northern Electric as a service correspondent and later became district service and credit manager in Edmonton.

"That lasted for three years," he says. "Then, one morning, I got a phone call from Fraser Fulton, who was vice-president of the general sales division in those days. He said, simply, 'I want you in Montreal . . . tomorrow.' Now, when Fraser barked, you jumped. And you can believe I was in Montreal . . . the following day."

A frustrating eight months followed while Fraser Fulton tried to make up his mind whether to keep the young executive in Montreal. It meant frequent flights back to Edmonton to see his young family. The rest of the time he languished in the YMCA. Finally, it was decided. Montreal was to be his base, and here the Walkers have stayed, and probably will remain. "We'd always planned to return to Vancouver when I retired," he says. "But now, I don't know . . ."

Mr. Walker gradually worked his way up through the ranks until he was appointed sales service manager of the Marketing Service Division in 1964. "I was contented and drifting gently towards retirement," he says, "and then I heard rumors about the Nedco thing they were planning to set up. Right off the bat I wanted it. I just wanted to be a part of it."

His enthusiasm was contagious. Came the day, shortly before he was due to retire, he was called into John Lobb's office and offered the top job at Nedco. Mr. Lobb is chairman of the board, and chief executive officer of Northern Electric.

"I said to him, 'I've made such a noise about wanting this job, I daren't turn it down'," he chuckles.

So, when most men are calling it quits, Syd Walker revved up for a new career. And he's pretty ecstatic about it. "It gives me terrific satisfaction," he glows. "I've got a wonderful bunch of people who've really made this company sail. We're profitable beyond our wildest dreams, just about the most profitable distributor in North America," as well as being the number one distributor in its field in Canada.

Life is looking pretty good for him now. He has the job he wants, a home in Pointe Claire, and two children — Judy in Virginia, who's married with two small children, and Bob, pushing 15, "a lazy creature," says his father

affectionately, "but he has all the capabilities."

He talks of the two children who died. Richard, his eldest son, who was killed flying a naval aircraft, and Jane, who died of Hodgkin's disease when she was 20.

"Richard died in the midst of action, the kind of action he liked. It was a calculated risk . . . Jane was a real extrovert, outstanding at anything she did, everybody thought the world of her. She put up a heck of a good fight for two years, then one day the thing went crazy and they took her into hospital. Within two months she was dead . . ."

It is not a sob story and he doesn't tell it that way. It is a factual, unemotional account of two incidents in his life. Only the slight shaking of his hand as he reaches for a cigaret gives him away.

"Smoking!" he laughs. "Well, if we're going to talk about my bad habits, put that at the top of the list. I smoke far, far,

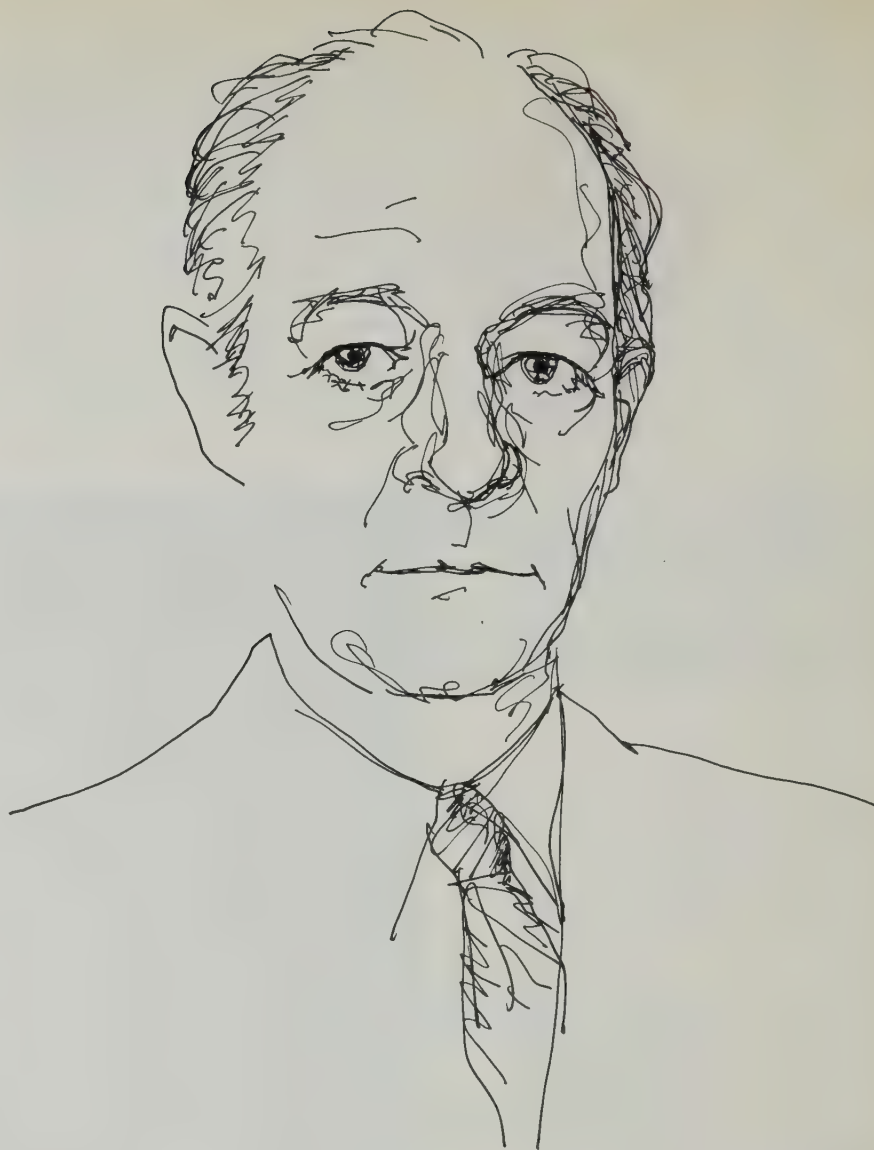
far too much. Two packs a day. I get up in the morning and choke to death but I haven't the intestinal fortitude to quit. I'm getting lazy . . . not on the job, but around the house. My wife says I talk about work too much . . . and I'm the world's worst golfer."

On the flip side of the coin, he's given many years of service to scouting and the church, and he's actively involved in community affairs in Pointe Claire. In fact, he's a pretty active man. At least once a year he visits all the Nedco branches, 55 of them, right across the country. "It's good for morale," he says. "I probably know more people in Nedco personally than anybody else."

And what of the future?

"More of the same, I hope," he laughs. "My dad's 97 . . . and still very fit . . . and mother's 87, so it looks as if I have a long way to go yet . . ."

Brenda Sivers



Stamps chronicle telecommunications history

The communications industry has received many accolades for its contributions to human progress, but the most consistent bestower of honor has been the postage stamp.

Stamps of almost all nations have been issued to commemorate some facet of the industry. The telephone, the radio, television, telecommunications-at-large — even computers — have all been subjects of hundreds of stamps. Included in a list of postal honors are many pioneers in the various branches of the industry.

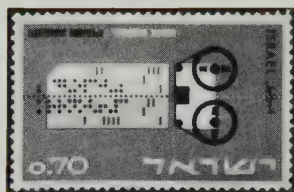
Indeed, a collection of communications stamps can be assembled to chronicle the entire history of the industry, from the Greeks who set fires on mountain tops to signal the fall of Troy to today's Telstar and Syncom satellites. A collection of communications stamps is a miniature art gallery. It portrays not only the development of the industry, but the progress of mankind which was always dependent to a great extent on its ability to communicate.

The large number of stamps issued around the globe each year to honor the sectors of the industry clearly underlines its importance. Governments usually issue stamps only on such subjects they consider of great importance and interest to the majority of their citizens.

This can be well illustrated with two examples. Prior to 1950, only a few stamps existed which showed the telephone.

Then, as Europe recovered from the ravages of the war and as the new, emerging nations began to enter the world arena aware of the importance of communications, the telephone suddenly became indispensable, and, during the past 20 years, fairly commonplace throughout the world. As the telephone instrument became more readily available, the stamps depicting it became more frequent. Today, it is a well-accepted stamp design.

This pattern now is being repeated



with stamps depicting telecommunications via satellites and television. As more earth stations are set up, more of them appear on stamps of the nations where they're located. A growing number of countries are issuing stamps picturing the satellites which instantaneously bring them worldwide news. The television antenna mast at the 1972 Munich Olympic Games was an instant success as a stamp design and has appeared on stamps of at least six nations. During the past three years, TV has come into its own as a stamp design — which parallels its spread around the globe.

Right now, the postal world of communications is entering into the age of the computer, with "computer stamps" appearing sporadically here and there. No doubt during the next few years, as the computer becomes commonplace, it will become a "usual" stamp design alongside the telephone, radio and TV.

To depict how nations have honored the communications industry on postage stamps, we are reproducing on this page and on the back cover a selection of capsule descriptions of postal honors for a number of elements in telecommunications-at-large. ②

M. W. Martin

1. World's first "computer stamp" issued by Israel in 1964 to promote Israeli exports.
2. TV antenna mast at the 1972 Munich Olympiad, on a stamp from Yugoslavia.
3. Stamp from a West German souvenir sheet of 1973, issued for the 50th anniversary of broadcasting in Germany.

Stamps honor telecommunications people, events, ideas



1. Alexander Graham Bell, on a 1965 stamp from Monaco, issued for the centenary of the International Telecommunications Union.
2. André Marie Ampère, who gave us the "amp," on a 1936 stamp from France, issued on the centennial of his death.
3. One of the latest computer stamps, this one was issued by Ivory Coast in 1972 to mark the development of computerized information.
4. Canadian commemorative issued July 26 this year in honor of the 100th anniversary of the invention of the telephone by Alexander Graham Bell.
5. The late United States President John F. Kennedy speaking via telephone with astronauts; the stamp was issued in 1965.
6. A 1956 Red Cross stamp from Guatemala with the telephone number of the Guatemalan Red Cross.
7. Telecommunications stamp from Nigeria, 1965.
8. Typical communications stamp, this one from Portugal in 1974.
9. United States "TV stamp" which formed part of the quartet issued in 1973 to mark progress in electronics.
10. British TV stamp for the BBC's 50th anniversary in 1972.
11. In 1973, Belgium celebrated the 50th anniversary of broadcasting.
12. A police radio operator on a 1973 stamp from Austria, issued on the 50th anniversary of Interpol.

(See story on inside back cover)

the innovators

AR21

Vol. 1, No. 6, November 1974

Bramalea, Ontario:
Switching capital of Canada

Early broadcasting:
Northern Electric as midwife

Essay-of-the-month:
Toward the Third Age



The Innovators



Published monthly by
**Northern Electric
Company, Limited**

1600 Dorchester Blvd. West
Montreal, Quebec H3H 1R1
November 1974 Vol. 1, No. 6

Editor: Dick MacDonald
Associate Editor: Danielle Dionne
Art Director: Jocelyne Chicoine

Permission to reprint articles is not required, although acknowledgement of source is expected.

Product names *TOPS*, *Logic*, *Pulse*, *Minibar*, *Venture 1*, *Digitone* and *Contempra*, used in this magazine, are trademarks of Northern Electric.

Printed in Canada

Les Innovateurs, édition française, est à votre disposition si vous désirez en faire la demande.

Illustrations:

Cover, Ron Vickers
Bramalea, pages 2-4, Ron Vickers, Berdj Tanielian
Ring, page 5, Graetz Bros.
Human factors, pages 6-8, Alan Bowering
Retirement essay, pages 13-16, Sue Scott,
Canada Wide
Libraries, pages 17-18, Murray Mosher, Graetz Bros.
Pulse 120, pages 23-24, Bill Riley
Baillie profile, pages 26-27, Aaron Rand

Cover:

Assembling racks of equipment on an electro-mechanical switching frame at Northern Electric's Bramalea plant. (Story on pages 2-4.)



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Notes from the Editor



French novelist Simone de Beauvoir calls it the Third Age, that period of life when we are no longer occupied in daily jobs. How to make the post-work period — the retirement years — satisfying is a matter of increasing concern in modern society. Experts agree that an early start on retirement planning is necessary. In a guest essay in this issue, D. B. Macfarlane, a long-time student of the social problems associated with the post-work years, discusses some of the ways to prepare for retirement.

It's sometimes hard to believe, now that we're immersed in complex technologies, that radio as a popular means of communications is only a little more than 50 years old. Perhaps there aren't too many people who recall that Northern Electric was very much involved in broadcasting in its early days, so this month we take a retrospective look at those pioneering activities.

Our continuing series of feature articles on the communities in which Northern Electric has operations, this month focuses on Bramalea-Brampton, near Toronto. The company was the first industry to locate in what was intended to be Canada's first satellite city back in 1963; since then, 100 other large industries have set up shop there.

To meet the needs of customers in Canada's western provinces, Northern Electric has been conducting a vigorous expansion program. In this issue, we carry reports on new plants which will be constructed in Regina, Saskatchewan and Calgary, Alberta.

We're pleased to report that readers' response to *The Innovators* has been most encouraging and we appreciate your comments, views and suggestions. This month we carry our second page of letters-to-the-editor; the page will appear as and when we hear from you. ☐

Almost everyone who is familiar with Northern Electric's telephone switching equipment headquarters, just northwest of Metropolitan Toronto, calls it "The Bramalea plant."

And rightly so, for not only is the plant situated in the community of that name, but it acted as a midwife at Bramalea's birth. So lusty was the infant's growth that development rapidly approached the nearby Town of Brampton and other smaller neighbors until, in January, 1974, it became part of the new City of Brampton.

Northern Electric was the pioneer industry in what was intended to be Canada's first satellite city. It didn't work out quite that way, partly because it was too close to Toronto — one of the fastest-growing urban areas in North America and whose metropolitan population is 2.2 million. That, however, was the original plan of a group of businessmen who, in the late 1950s, bought up 6,100 acres of farmland in Chinguacousy Township, and set about creating a model and totally self-sufficient community. They gave it the name "Bramalea" (from *Brampton*, *Malton* — the nearby international airport and incorporated village, and "*lea*", meaning fields) and called their company Bramalea Consolidated Developments Limited.

Northern Electric's work force has grown from 550 in 1963 to 4,000 in 1974, and more than 100 other large industries have come to Bramalea since Northern Electric first began the trend.

To capture the magnitude of the Bramalea plant one should view it from the air — or contemplate the fact that fire and accident emergency personnel use bicycles to get from one part of its 20 acres of floor space to another. Around the plant itself are 60 acres of lawns and recreational areas.

The plant was built in 1963 on the outskirts of Brampton, a pretty little town of large, Victorian-era brick houses, sweeping lawns, a blanket of shade trees and a typically Ontario small-town main street of low-rise shops and office buildings. Most of the inhabitants ran businesses which catered to the surrounding farmlands — some of the richest loam in Canada.

When Northern Electric moved in, cows grazed within a stone's throw of the factory site. Now, on Dixie Road, a main artery that traverses the area, cars and trucks pass continually. A company history states, "You could look out the office window and see rabbits, geese, and even pheasants feeding in the greenbelt behind the plant — when it began manufacturing operations in 1963."

BRAMALEA SWITCHING CAPITAL OF CANADA



Industry today is concentrated within the 2,400 acres of Bramalea Industrial Park — the largest of its kind in Canada and one of the best in North America. Its location — west, south and east of residential Bramalea — is the focal point of highways, rail lines and arterial roads, shifting transportation away from homes. Northern Electric is the largest complex in the industrial park, and its chief single employer.

Construction on the plant began in 1960. Meanwhile, operations were initiated in a pilot plant on Orenda Road.

By 1961, the company started a second pilot plant in Bramalea, which brought the total number of employees and trainees to 311. In 1963, the work force moved into its present Dixie Road home. A research and development building was added in 1968.

When the plant opened, it manufactured only crossbar switching systems. Today, it is the company's overall switching equipment headquarters. Switching equipment, a basic part of every telephone network, forms the heart of telephone exchanges.



The sprawling Bramalea plant.

The manufacture, marketing, sales and installation of advanced switching equipment is co-ordinated within the Bramalea complex. In fact, more than 75 per cent of all new switching systems in Canada are made there.

While assembly of electro-mechanical switching systems still takes up the largest amount of floor space at the plant, increasingly attention is being paid to electronic switching. As the world's communications needs become more sophisticated, acceptance of the Northern Electric SP-1 computer-controlled stored-program electronic switching system now is taking place throughout North America.

Bramalea built and installed the huge forerunner to the SP-1 system, the ESS electronic switching office for Montreal's Expo 67. In 1971, the first SP-1 switching office was put into service at Aylmer, Quebec.

SP-1 equipment provides a wide range of new services for both business and residential customers, due to its completely electronic central processing unit, which incorporates a computer capability. Its reliability is greater since it constantly checks itself automatically for faults, traffic load and trouble spots. Easier maintenance and much faster call routing are other advantages, and the SP-1 takes up only half the space needed by traditional electro-mechanical systems.

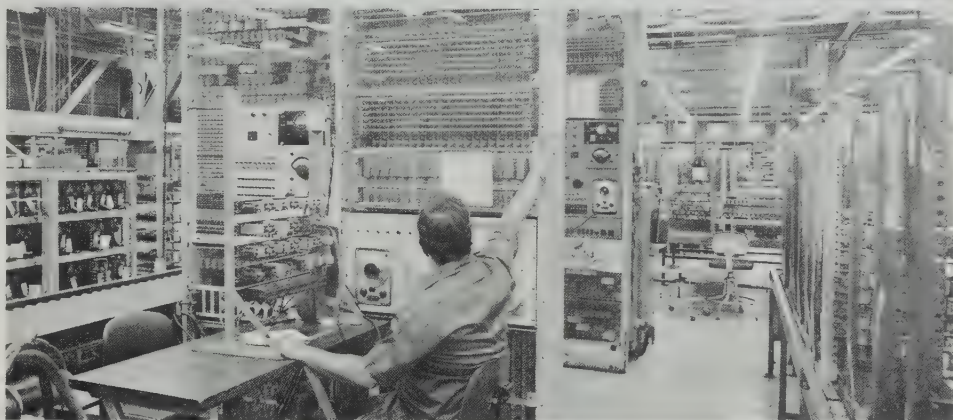
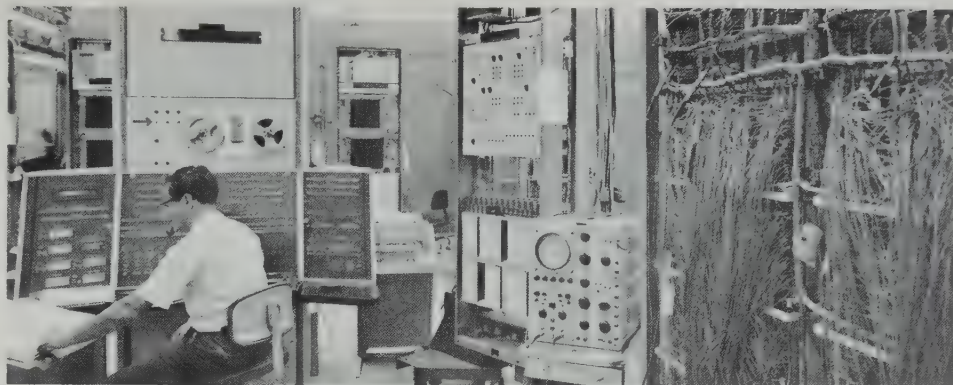
Elliott Turcot, vice-president, switching, points out that "Our manufacturing experts have developed test equipment, as well as methods and procedures, recognized as among the most advanced in the world — we are visited by telephone officials from all areas of North America, as well as from overseas."

The residential section of the Bramalea community has been compared to "a collection of small villages" — and one can easily tell the age of a citizen's home, since the names of the streets in the oldest "village" begin with an A, those of the second oldest, with a B, and so forth.

Among the most recent and imaginative housing developments are Bramalea's "zero lot line" homes in Central Park Village, where one-to-three-storey houses are set apart from each other for maximum privacy. Also, the Folkstone Terrace "stacked" townhouse development offers another alternative, with two-storey condominium units stacked three deep.

Bramalea has its own shops, schools, churches, theatres, playgrounds and parks. Bramalea City Centre, opened in early 1973, encompasses 160 stores

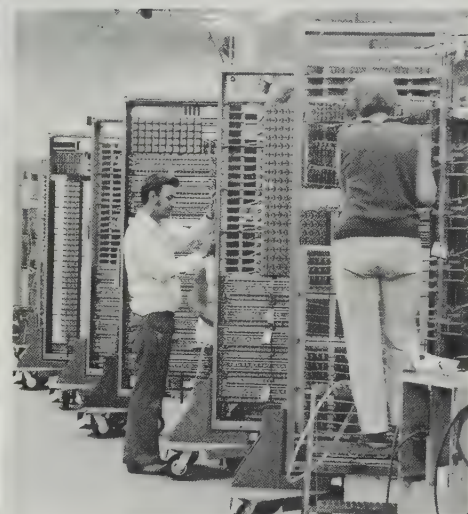
Testing SP-1 electronic switching system frames with the aid of a computer.



Electromechanical switching components being tested.



Automatic coil winding.



Wiring Minibar switches for SP-1 systems.

and services, three cinemas, an auditorium, and several restaurants; and there are other shopping malls in the community.

The Chinguacousy Civic Centre, now serving the City of Brampton and the newly-created Region of Peel, includes such facilities as a library, art gallery, post office, live theatre, a community television studio, skating rink and town square. Most denominations are represented among Bramalea's churches;

and the community has 600 acres of parkland highlighted by the 100-acre Chinguacousy Park with floodlit courts and fields for baseball, softball, soccer and football, a snow-sports hill and children's playground. Earnscliffe Park's recreation centre has a swimming pool, indoor arena, saunas, squash courts and fitness rooms.

Not all Northern Electric employees in Bramalea live there, however, nor do all its inhabitants work there.

Budding golfers in a Bramalea park.



Chinguacousy Park greenhouse complex.



Leaving the Bramalea Civic Centre.



Civic Centre library.



Residential Bramalea.



Community police headquarters.

Today, about 500 of Northern Electric's total employee force of 4,000 live in Bramalea. "Another 1,000 live in the former town of Brampton; and the rest are spread out over a 35-mile radius in the Metropolitan Toronto area," says Gordon Campbell, manager of

professional and technical recruitment.

Bramalea had sufficient appeal as a place to live that it attracted a diverse range of people who worked in Toronto, Hamilton, London and other southern Ontario cities to make their homes there. Therefore, Northern Electric

employees rub shoulders with a highly cosmopolitan blend of neighbors; and the plant has an almost unlimited labor pool from which to draw.

Neighborliness is not just an "after-five" thing at the Bramalea plant. The company has made a 25-acre piece of land located behind the manufacturing facility available to the City of Brampton for softball, cricket and football. "You'll see kids from town, and adults, too, on our ballgrounds every night of the week, and on weekends," says Helen Caines, a member of the Northern Electric Club.

The company also lends its plant auditorium to community groups for meetings, and donates surplus and obsolete equipment to technical training schools. Its staff sits on advisory boards of such educational institutions as Sheridan College, one of Ontario's community colleges.

Very much involved with the local community is the Bramalea plant's Chapter of the Telephone Pioneers of America, the largest international industrial community service organization in the world, with 300 active members at the plant and many retired members. President Art Pratt rhymes off a few of its recent projects: "We collected Dominion Store tapes and bought a camper for mentally retarded young adults at their Daybreak home in Thornhill, Ontario. We collected and repaired old bikes for another group of mentally retarded people; we built ramps at the homes of people confined to wheel-chairs; and we repair TV sets for hospitals and retirement homes."

As part of its community interest, the Bramalea plant's management has spent \$500,000 on special equipment to combat water and air pollution during the 10-year period from 1963 to 1973.

Northern Electric employees feel very close to their community, says Al Stankus, of customer services, who was one of the first employees to transfer from Montreal to the new plant back in 1961. "My wife and I moved into Brampton, because Bramalea housing was just a pretty picture on the developers' wall at that time. We're proud to mention where we live, and we're proud that Brampton's a city now. We feel that we helped bring that about."

Bill Mosley, an information officer for the Region of Peel, thinks that Bramalea as a place name likely will be forgotten eventually as the city grows larger. Al Stankus disagrees. "The people who settled there worked hard to get that community going. They'll cling to the name." ■

Northern Electric signs contract with Norway firm

It could be the bracing northern climate. Or more likely, a sense of isolation created by vast distances that makes people want to communicate with one another. Whatever the reason, Canada and Norway share a common tradition: excellence and ingenuity in telecommunications design and products.

That common footing between the two countries became stronger as the result of a contract concluded in October between Northern Electric and Gustav A. Ring A/S of Norway, an accord that underscores Northern Electric's continued penetration of European markets.

A five-year contract for the mutual distribution and manufacture of telecommunications equipment between the two firms was signed by John C. Lobb, chairman of the board and chief executive officer of Northern Electric, and Gustav A. Ring, president of the Ring Group. It consists of three separate agreements, and allows for yearly renewal at the end of the first five-year term.

The first agreement opens a gateway to the growing Scandinavian telecommunications market of Norway, Denmark and Sweden, along with Finland and Iceland. There's a total of almost nine million telephones in the five countries, in which Ring will act as distributor for several of Northern Electric's leading business apparatus products. These include the Logic telephone; the Pulse electronic private automatic branch exchange (EPABX); a key telephone system that directs and channels calls to and from key telephone sets; the lightweight, miniaturized Venture I headset; a lineman's handset used for equipment testing and the Companion handsfree telephone set.

The second agreement gives Northern Electric North American distribution rights for Ring's automatic ACD 5000 call distributor. This device is a computer-controlled modular system that ensures telephone calls are answered in rotation. It is ideally suited to



At the signing of the contract for distribution and manufacture of telecommunications equipment are, left to right: Niels Nokleby, vice-president of sales of Gustav A. Ring A/S of Norway; Gustav A. Ring, president of the Ring Group; and John C. Lobb, chairman of the board and chief executive officer of Northern Electric.

distributing calls efficiently over such multi-line systems as airline reservation offices or department store mail-order offices.

Both agreements allow for future licensing and manufacturing rights and exchange of technical information.

The third agreement is a licensing arrangement providing Ring with the rights to use Logic telephone styling for an intercom unit for sale inside and outside Scandinavia.

The Ring Group is synonymous with telephony in Norway. The company, comprised of a dozen separate firms each with its own sales and service subsidiaries, advertises with the slogan "Ring to Ring."

From its headquarters in the capital city of Oslo, Ring engages in specialized telecommunications manufacturing in Europe, as well as carrying out extensive research and development activity.

Ring also has a distribution and service organization for products from major telecommunications manufacturers.

Its research and development department has created several outstanding products, including the Ring-Master intercom system; systems for air traffic communication control (both civilian and military); the Triphone, the world's first one-piece loud/soft speaking telephone; a modular electronic telephone switching system; and a computerized currency exchange system.

Ring's affiliated companies produce an advanced range of hybrid large-scale integrated circuits and a new series of systems for both telephone sets and switching. With an organization that has offices throughout Scandinavia, Germany, Brazil, and the United States, the company's export division has successfully marketed its Ring-Master and equipment in more than 40 countries. □

Making technology work for humans

Can man live with the almost overwhelming technology he has created? Or does he resent and fear it, co-existing in a Charlie Chaplinesque world of hair dryers which act like vacuum cleaners, elevators which go down instead of up, and computer cards which claim you purchased a \$200 tooth brush?

That, in essence, is what 70 leading telecommunications specialists, psychologists and scientists dealt with at the Seventh International Symposium on Human Factors in Telecommunications, held in Montreal. And while the delegates didn't reach bedrock conclusions, they raised some pertinent questions about how people — the creators, the technicians, and the general public — feel about and use today's complex telecommunications equipment and systems.

This was the first time the conference, held every two years, took place in North America. It attracted international experts in a wide range of disciplines from 13 countries, and was jointly sponsored by the Canadian Telecommunications Carriers Association, Bell Telephone Laboratories (U.S.A.), and General Telephone and Electronics Service Corporation (U.S.A.).

Bell-Northern Research, Northern Electric's research and development affiliate, played a key role in the five-day event, which featured a full day's tour of its Ottawa laboratories. Jim Gale, manager, human factors in BNR's design interpretive group, was chairman of the symposium's program committee and was on its organizing committee.

"Human factors is really a meeting of the techniques of psychology and telecommunications research and design. We want to discover how people *perceive* things so we can design equipment that they can feel comfortable with," Mr. Gale says when explaining that virtually the entire gamut of human behavior is analyzed when his BNR

group is creating a product.

It can be — and often is — as simple as ensuring that fingers fit into dial holes on telephone sets. It is this kind of subtle design technique which helps people use telephones without becoming fatigued, bored, or frustrated with them.

"If you want a perfect example of what human factors in telecommunications is all about, just look at a typical telephone handset," Mr. Gale says, "because it's designed for humans." Built into a telephone handset are preferred *listening* levels (sound levels that make communication easy, rather than annoying), an average *talking* level that achieves the same effect, and *side-tones*, where a part of your own voice feeds back to you, going through your left ear. All these features add to the comfort of telephone usage but they're features that most people are totally unaware of.

"We've found that telephone operators have a high turnover rate, so at BNR we have been trying to find out why through examining their attitudes toward the equipment they work with," says Mr. Gale when pointing out that people who work for telephone networks, particularly operators and maintenance personnel, should feel totally at ease with the machinery that's a part of their jobs.

Northern Electric and BNR have jointly developed the Traffic Operator Position System, an excellent example of putting human factors study to a particular use. The TOPS equipment, as it's called, was created by studying office and equipment design in other industries in order to design efficient and comfortable work stations for telephone operators and supervisors.

The TOPS equipment now allows an operator to perform his or her job while seated comfortably in front of a video screen and keyboard. While screens located on the side of the TOPS console provide an atmosphere of privacy and relative peace, the operator can handle calls more simply and effectively.

Telephone networks are one of the larger parts of the total telecommunications picture and Mr. Gale, along with BNR associates and symposium delegates, are concerned with helping subscribers understand how to use them. For example, tones fed back to users from the network aren't, as he puts it, "good information carriers" — at least at this stage.

"There are real difficulties in getting people throughout the world to perceive what a certain tone means to them. Due to variances among telephone systems, dial tones and busy signals have different sounds in different countries. There-



TOPS equipment (Traffic Operator Position System), the computerized console feature of the SP-1 electronic switching system, is an answer to the telephone companies' need to improve working conditions for operators and to make the handling of calls simple and efficient.

fore, they don't have the same meaning for everyone. Yet ideally, everyone should be able to place a call in any country, without having to ask for help."

One of the problems tackled at the symposium was standardization of equipment among telephone systems. Delegates examined the growing trend towards using internationally-recognized pictograms and symbols in telephone booths, only one way of conveying a common understanding of how they're to be used.

"The world's telephone networks are moving closer towards total connection. Soon, we'll reach the point where direct dialing can take place from one point to another in most places around the globe," says Mr. Gale.

Telephone systems which were built and grew up in isolation are now beginning to conform to a universally-accepted frame of reference. This, he believes, is one of the key issues facing the telecommunications industry of the future. And it is an industry that's expanding in a world which must, out of necessity, find better ways for people to communicate with each other.

There are however, much broader implications extending beyond telecommunications and applying to technology as a whole. Mr. Gale wants to find out more about how people relate to the sophisticated machinery of the 1970s. It's the rapport you establish with your car if you're a driver, your typewriter if you write, and particularly with computers — if that is the way you communicate and process your own particular storehouse of knowledge.

"In human factors study, we have found there are basically two types of individuals — 'thing lovers' and 'people lovers'. Some people derive more satisfaction from dealing with a machine than they do with other people," Mr. Gale says.

In terms of communication, this means that "thing lovers" might often find a substitute, such as a television image, with which to identify. They tend to prefer the substitute to face-to-face contact.

"There is also a great deal of work being done in machine feedback. By this, I mean the reaction people have to a particular device. For instance, you might have a certain expectation of what a machine should do — and when it doesn't conform to your expectations, you may become angry and unhappy."

In striving to achieve that conformity, designers, psychologists and engineers are combatting the frustration caused by this lack of understanding between



BNR's Jim Gale at work in the Ottawa laboratories.

man and machine. Some people have an innate need to feel as if they are making a piece of equipment do *something*, even if it's only pushing a button that "clicks" back when you expect it to.

It is in precisely this area that such people as John Karlin of Bell Laboratories, regarded as the founding father of the symposium concept, are continuing to probe for solutions to the complex problems posed by telecommunications.

What Mr. Karlin, who was on the organizing committee of the Montreal conference, began as private discussions among specialists now has become a significant meeting place where the implications of telecommunications for mankind is the main bill of fare. And the emphasis at the symposium — the last one took place in Stockholm, Sweden in 1972 — has shifted more to the needs of the subscriber.

The idea of human factors, Mr. Gale explains, dates back to World War II, when cockpit designs in aircraft became more complicated. At that point in time, it was the old case of the machine not meeting man's expectations.

"Pilots began to use artificial horizon indicators, but found they didn't perceive the horizon the same way they did when they relied on their own eyesight. In fact, the early artificial horizon devices performed exactly opposite to how pilots thought they would. And that meant problems."

Since then, the man-versus-machine syndrome has formed the backbone of human factors research. It is a field that demands the multi-disciplinary approach which symposium delegates

have adopted, because so many aspects of inter-personnel relationships — let alone relationships with machines — still aren't either well understood or agreed upon.

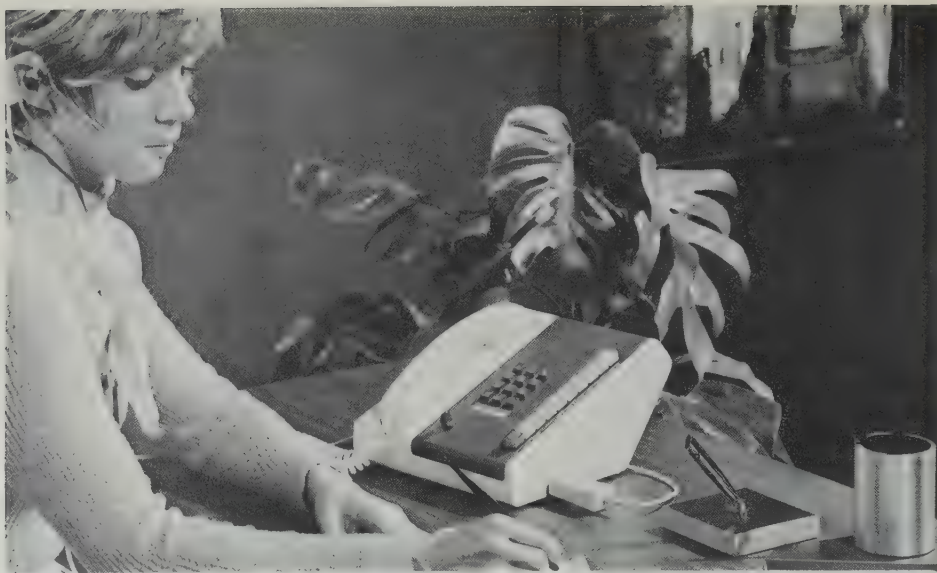
"We can, technologically, make virtually any device we want. The trick is to make machines that people can use, rely upon, and trust," Mr. Gale emphasizes.

The design interpretive group at BNR, of which human factors is a part, includes about 25 psychologists, engineers, statistical methods experts, industrial designers and prototype exploration personnel. In their Ottawa laboratories, this team carefully examines what people like and dislike about the products created by BNR.

The group uses a battery of psychological testing methods that include semantic differential tests (which explore the meaning of objects), attitude tests, and other ways of discovering basic — and often unconscious — feelings about the telecommunications equipment dealt with on an everyday basis.

"One of the most important new areas in human factors research is the idea of people processing information in their minds. Despite the fact we use speech every day, and telephone companies are in the business of transmitting speech, we know precious little about the way in which it is perceived and processed by people."

As designers, he adds, this has vital implications for future telecommunications products. Mr. Gale and his colleagues want to be able to code



The Venture I headset is an example of remembering the wearer's comfort when designing equipment.

speech; they also want to transmit it with ease over longer distances. But to accomplish these aims, they must first comprehend what happens when people *hear* speech.

"We have discovered that a great

deal of speech is redundant. And to grasp even such a grass-roots idea as this, we must rely on the resources of research people from many different fields. Engineers can learn from psychologists, and designers can get

an idea of problems facing statistical methods analysts," Mr. Gale says.

To obtain that background, the symposium drew upon the expertise of people who are aware of what is happening in the community at large, because, as he puts it, "science cannot explain everything."

He believes the conference attempted to do a unique and powerful thing: to develop a group approach capable of covering the entire spectrum of issues from consumer research to scientific innovation.

"To make the product — a telephone set, a data unit, or whatever — we need to understand that device's implication from every viewpoint. I think this type of research is going to become a key factor in the future of telecommunications development," Mr. Gale predicts.

Human factors in telecommunications, then, is a concept whose time has arrived. It may, as its exponents hope, provide an integrated approach to the man-machine seesaw — one in which products will be developed that are usable, desirable, and, yes, profitable. ■

Lloyd Landa

Specialists, generalists work together

Never in Canada's history has there been a greater need for cooperation between scientists and government — and today's telecommunications industry is a prime example of specialists and generalists working together to provide a technology that is beneficial to society.

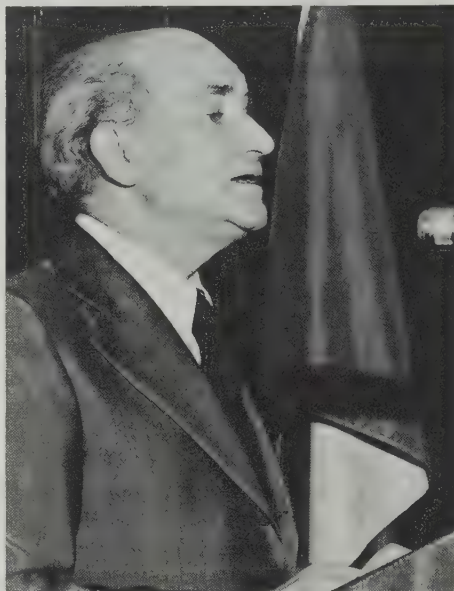
This is what Gérard Pelletier, Canada's federal minister of communications, told delegates at the closing banquet of the seventh International Symposium on Human Factors in Telecommunications, held in Montreal.

"There is a special obligation on the part of scientists to think beyond normal applications of what they have created. You have to take into account the social implications of what you make available to people, and the politician, on his part, must remember to work hand-in-hand with the scientist," Mr. Pelletier said. "That's not easy — but it's absolutely necessary."

In dealing with the scientific community, Mr. Pelletier said he found specialists extremely willing to communicate

and explain their knowledge to anyone who was interested in asking.

"When I was first appointed minister of communications in 1972, I asked several telecommunications experts to tell me what it was they were doing. If I couldn't understand, how could the taxpayer be expected to?



Hon. Gérard Pelletier

"Fortunately," he said, "we do work well together, and that's crucial, because telecommunications is definitely the field of the future in this country.

"There are two schools of thought on the applications of technology. One says that because something has been invented, it must be used. The other, to which I subscribe, says judgments must be made. Technological progress is not necessarily human progress."

This, Mr. Pelletier said, is a prime example of human factors in telecommunications. "After all, telecommunications certainly aren't forced upon people by technicians."

Canada's telephone networks play a vital role in linking the country together, as do radio and television. Mr. Pelletier estimated that about 80 per cent of urban Canadians have access to cable TV, with approximately 40 per cent of the population now linked by cable networks. "We've fallen harder for this telecommunications phenomenon than any other nation, much more so than the United States."

When Canada launched Anik I, the world's first domestic communication satellite in November, 1972, Mr. Pelletier made a special call from Ottawa to Resolute Bay. "I was informed that this was the same distance as Paris, France is from Karachi, Pakistan."

To him, this signified the triumph of telecommunications in bringing Canadians closer together. "It's been the problem of the past, and now is the challenge of the present and the future for this country." ■



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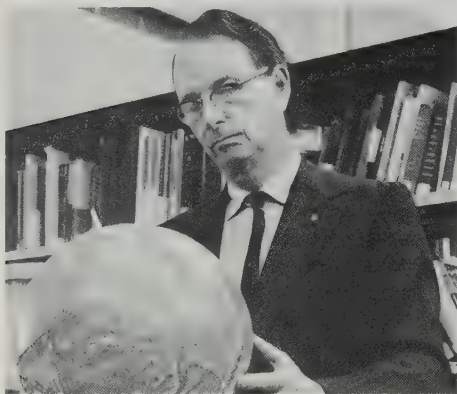
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R. H. Tanner

Robert H. Tanner, director of industrial programs in Canada's Department of Communications (on industrial exchange from Bell-Northern Research), has been awarded the McNaughton Gold Medal Award for an outstanding contribution to engineering. Presented at the Canadian Communications and Power Conference in Montreal November 6-8, the McNaughton Gold Medal is the highest honor of the Canadian Region of the Institute of Electrical and Electronics Engineers (IEEE), and is awarded for an "outstanding contribution to electrical or electronics engineering." It is named in honor of General A. G. L. McNaughton, famous Canadian engineer, soldier and administrator. In 1972, Mr. Tanner was president of IEEE, a world-wide organization of some 170,000 engineers — the first Canadian to hold this office. Until the exchange, Director of Information of Bell-Northern Research, Mr. Tanner, who was born and educated in England, has been associated with Northern Electric since he came to Canada in 1947. A specialist in acoustical problems, Mr. Tanner has advised architects and carried out the acoustical design for the Stratford Shakespearean Festival Theatre, in Ontario; the Expo Theatre in Montreal; Sir George Williams University, also in Montreal; and Mani-

toba Theatre Center, in Winnipeg, as well as many others from coast to coast.

An award for the best management paper presented at the annual conference of the Society of the Plastics Industry of Canada went to Laurie Miller, senior staff engineer of Northern Electric's Electro-Mechanical Switching Division at Bramalea. He received a wall plaque and a cheque at the conference, which was held in Quebec City. The subject of his paper was "Why Plastics Material Selection by Computer is the Best Approach" and described a Northern Electric computerized selection system which already has been purchased by five United States companies. It is the first time since 1969 that a Canadian has received the award.

An October seminar for plant-level communications officers unofficially marked start-up of a network of employee publications within Northern Electric. The publications are part of an evolving communications program which includes *The Innovators* on a corporate, international scale. The plant or divisional publications — aimed strictly at internal audiences — are being produced by officers who have been, or are being, appointed this autumn. The seminar, held in Montreal, covered such areas as editorial style and contents, typography, design and printing. Senior management participants, who discussed employee communications from their particular

perspectives, were C. G. Millar, executive vice-president, operations; Roy T. Cottier, vice-president, corporate relations; Jacques Ouellet, vice-president, personnel and industrial relations; and Richard Fortier, vice-president, industrial relations. Similar seminars are planned for 1975.

A delegation of five government officials from Bulgaria, headed by Dr. Vladimir Bonev, president of the National Assembly of Bulgaria and the Bulgarian ambassador to Canada, Lyubomir Zhelyazkov, last month visited Northern Electric's wire and cable plant in Lachine, Quebec. Of the sights they saw in their 90-minute tour of the sprawling million-square-foot plant, the largest cable manufacturing facility in Canada, the one part that may have made the visit stand out was a small Bulgarian flag thoughtfully hung at the front of their tour train. The tour, which covered all aspects of cable production, was conducted by Walt Tims, general manager, Lachine communications cable division, and Bob Watt, assistant vice-president, staff, cable division. Other members of the Bulgarian delegation were Luben Stefanov and Zdravko Mitovsky, members of the National Assembly of Bulgaria and Pencho Markov, a staff member. Canadian government officials accompanying the group were Col. Tom Bowie, tour co-ordinator, and Harry Davin and Jacques Vermette, all of the inter-parliamentary relations branch.

On the Market

	Sept. 30	Oct. 31	Change	%
Dow Jones 30 Industrials	608	666	+58	+10.5
Toronto Stock Exchange Index	151.43	166.55	+15.12	+ 9.9
Montreal Stock Exchange Index	152.40	173.86	+21.46	+14.1
Northern Electric	21.00	20%	— .875	— .4
Microsystems International	3.00	2.65	— .35	—16.7
Bell Canada	42¼	41%	— .875	— .2

Record year so far for Northern Electric

Record sales and earnings were reported by Northern Electric for the first nine months of 1974.

Sales by Northern Electric and its subsidiaries were \$702 million and consolidated net earnings were \$42 million

for the nine-month period. Sales were 66 per cent higher than the \$422 million reached in 1973 when Canadian operations were affected by a strike. Earnings were 107 per cent higher than the \$20.3 million achieved in the first three quarters of last year.

Earnings per share were \$1.61 for the first nine months of this year, when there were 26,162,500 shares issued, compared to 86 cents per share earned in the same period in 1973, when there were 23,562,500 shares issued. Earnings would have been higher this year

had not Microsystems International Limited — 68.5% of whose shares are owned by Northern Electric — suffered losses of approximately \$7.7 million for the January to September period.

Commenting on the slowdown of the world economy, John C. Lobb, chairman of the board and chief executive officer, said that steps have been taken to ensure that costs are kept under control for the uncertain economic period in 1975. He noted that the volume of orders on hand for 1975 is at a satisfactory level. ☐

Tradition and technology meet in Olympic flame

Organizers wanted an "old flame" from Greece to come to the 1976 Summer Olympic Games in Montreal and asked Bell Canada how to set up the travel arrangements.

The "old flame" is precisely that — the flame which symbolizes the continuity with ancient Olympic traditions. Bell Canada, of course, is not a travel agency, but it does know how to bridge long distances. So under its auspices, Bell-Northern Research technologists in Ottawa set about devising a way of relaying the flame via satellite and laser from Olympia in Greece to Montreal.

Dr. Peter Luff, manager, display technology group at BNR, Northern Electric's research affiliate, claims his "simple process" has made the transportation of the flame "quick and clean." The process marries tradition with modern technology in a cost-effective way.

The project was started in 1973 and

kept under tight wraps until the Olympic organizing committee (COJO) could be convinced of the project's technical feasibility by seeing a working model.

COJO's approval was given to the project after a model proving feasibility was demonstrated in Canada then taken to Vienna to be displayed at the 75th session of the International Olympic Committee (IOC) in late October.

The lighting of the flame ceremony will start July 9, 1976, at Olympia in Greece. The congeneration of the rays of the sun, by parabolic mirrors, will light the flame in an urn placed before the temple of Hera.

A runner will light a torch from the urn and it will be carried to Athens where the formal ceremony of the passing of the flame will be held at Panathenian Stadium.

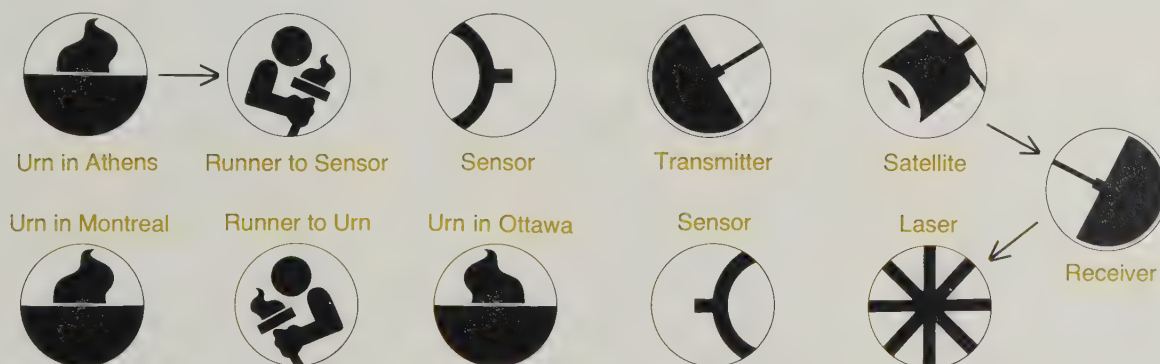
The runner will then place the flame against a sensor, an electronic triggering device that starts a coded signal to

Ottawa via satellite. When the signal is received, it will touch off a laser beam which will light an urn in Ottawa.

Immediately after its arrival in Ottawa, plans call for the flame to be retransmitted to each provincial capital and to the Yukon and Northwest Territories, so that everyone in Canada will have a sense of the games' significance, especially people in the Far North.

Television audiences around the world will be able to see the Athens and Ottawa ceremonies simultaneously, possibly on a split screen, and will hear the coded signal bleeping across the Atlantic. The electrical impulses can be transmitted by a normal telecommunications channel.

Canadian athletes will carry the flame 120 miles to Montreal from Ottawa on July 16. The following day, the flame will be carried to Montreal's 70,000-seat Olympic Stadium. ☐



This is your computer speaking . . .

She always gets the customer's name and address right, never forgets to record quantity, size, color and price, unfailingly asks for special instructions, and invariably reads back the order as all order clerks are supposed to do (but often don't). She immediately reports any mistakes or problems to her superior; and accomplishes the whole job in a fraction of the time her predecessors did. To top it all, this paragon of clerks, who works for Simpsons-Sears mail order house in Toronto, never loses her temper.

"She" is a computer, the key part of Simpsons-Sears Automated Order Service (AOS) for catalog shoppers, which is believed to be the first in the world. The other vital part of AOS is a 12-button Digitone telephone set, manufactured by Northern Electric and supplied by Bell Canada. The push-button set enables the customer to place orders without speaking into the telephone. In effect, the system converts the customer's telephone into a small home computer terminal.

"Imagine, last Christmas I ordered the children's presents without having to worry for fear they heard me," exclaims the first user of AOS, Mrs. Joseph Ken-

nedy. "It saves me a lot of time and confusion. In the old days I always had to spell out the name of our street (Bonnington). All I do now is press the buttons for my telephone number and our street number." The computer refers these numbers to the customer's file, which supplies her name and the full address.

The computer keys the item number, then checks with the catalog file, to determine which details (quantity, size, color, price, etc.) are required to complete the order, requests this information of the customer, then feeds it to another computer system to process the order. The total process is much faster than if it had been manually handled by a regular clerk.

Maurice Anderson, general manager, methods planning and development for Simpson-Sears, says that even were the system to cost more than traditional order taking, the company thinks the money would be well spent, since it so greatly improves customer service. Mr. Anderson says there has been no reduction in personnel so far, "and it will be perhaps 25 years, if then, before Automated Order Service replaces regular clerks."

Simpson-Sears ran a three-month trial of the system, starting with Mrs. Kennedy's first order, on July 31, 1973, and involving 1,000 regular Simpson-Sears catalog shoppers. During the trial period, when AOS operated only an hour a day (it now operates 12 hours daily), 453 customers successfully placed 1,130 orders. AOS now is available to all Digitone telephone subscribers in the metropolitan Toronto local calling area.

Mrs. Kennedy reports that her orders have always been delivered the next day, and that there have been no errors. Another feature for which she is grateful is being advised immediately when an item is out of stock. "Then I can get busy and find it somewhere else," she says. "With the old system, the clerks usually were unable to know stock had run out, and so I wouldn't know the order wasn't that complete until it was delivered to me, which might be a day or two later."

A recent refinement has been replacing the original "Miss Computer" for another whose voice sounds more human. The original Miss C. sounded like an escapee from the film 2001, talking in slight jerks, with a sudden, rising inflection on the last word in each sentence. (The jerkiness was caused by the fact that while the individual words are recorded on magnetic tape, the computer synthesizes its own sentences from this stockpile.) The new Miss C. has a slightly nasal accent, but her voice flow is more even.

What about those customers who, according to Simpson-Sears, just love to talk to the order clerk, even for hours at a time? (There still are plenty of operators, of course.) Doesn't Miss C's impersonality get under their skins? If it does, it won't do them any good to lose their tempers. Pleas, oaths, even obscene language cannot ruffle Miss C's calm. She makes the same response she makes to an incorrectly entered order — she simply repeats her last utterance until the shopper gets back on the track again. ☐

Elizabeth Kimball

Ads
in this
issue

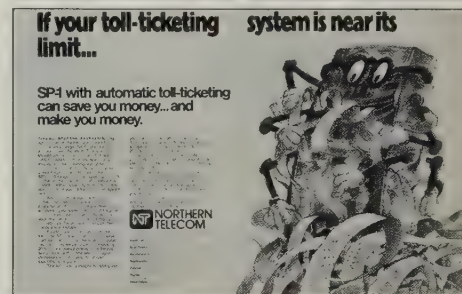
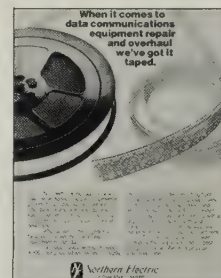
Products and service are the subjects covered in the three advertisements published in this November issue.

The Pulse 120 EPABX (electronic private automatic branch exchange) is a new and impressive business communications system. Being manufactured at Northern Electric's plant in Belleville, Ontario, and at Northern Telecom's plant at Mountain View, California, the Pulse 120 is the focus of

the back cover advertisement which will appear in selected United States telecommunications trade magazines. (Also see story on Pulse 120 on pages 23-24.)

Spread over page 28 and the inside back cover is an advertisement describing features of the SP-1 electronic switching system. This two-page advertisement also was destined for American publications.

Northern Electric's Repair and Overhaul Division (*The Innovators*, August, 1974) doesn't just inject some new life into telephone sets. The advertisement on page 9 explains that the company has full product support service for data communications equipment. This one-page advertisement has been published in several Canadian publications aimed at the data communications and electronics industries. ☐



Toward the Third Age

Essay of the month

by D. B. Macfarlane

The Voices of Experience:

Cato the Elder, early Roman statesman: "To live a long old age, learn to grow old young."

La Rochefoucauld, 17th century French philosopher: "Few know how to age."

Jawaharlal Nehru, late prime minister of India: "Time is not measured by the passing of years, but by what one does, what one feels and what one achieves."

Benjamin Franklin, American philosopher and statesman: "There is nothing wrong with retirement as long as one doesn't allow it to interfere with one's work."

Dr. Hans Selye, director of the Institute of Experimental Medicine and Surgery, University of Montreal: "For many people (even the avowed egotists), the most difficult aspect of retirement is the feeling of being useless."

John G. Diefenbaker, former prime minister of Canada: "Men and women over 65 are a national resource that we squander."

Plato's observation that "The unexamined, or unplanned, life is not worth living" has a special meaning for retired people who, for the first time, no longer have to follow prescribed schedules.

As long as a man or woman pursues a daily occupation, there is the advantage (which may not immediately be perceived as an advantage) of having each day almost totally planned. One gets up at a specified hour in order to get to the plant or office on time. One works the required number of hours and at the end of the day returns home.

Upon retirement, this direction no longer is available. Nor has the retiree the benefit of work associates. Unless this new period of life is planned, it becomes, in large part, meaningless. Like a ship without a rudder, the retired person will sooner or later land on the shoals of life. The analogy of the shipwreck and the aging was made by the late President de Gaulle of France during his later years. However, this can be avoided by following a carefully worked out plan.

There is another analogy, which can be an attractive one. That is likening the retirement years to the product of a fruit tree which, unlike ordinary species which produce but one kind, is capable of scores or even hundreds of varieties. The fruit tree looks extremely attractive from a distance, but as one approaches the goal of retirement the tree appears taller and taller. So much so that the attractive fruit is out of reach. Many things tend to make the fruit of the retirement tree inaccessible, such as lack of physical condition or the will to climb the tree, which does not automatically shower down its benefits on those who manage to come under its shadow.

A greater knowledge of retirement conditions, and what is

required to make the post-work period satisfactory, is one of the important assets to be obtained. Both government and industry are becoming increasingly aware of the necessity to prepare for what French novelist Simone de Beauvoir calls the Third Age.

During the summer of 1974, the Canadian Management Center of the American Management Association sponsored a seminar on retirement in Toronto. One expert said that an early start on retirement counselling was advisable and cited the federal Department of Public Works' program of counselling, which could be an example for industries and other ministries.

Recently, John G. Diefenbaker, former Canadian prime minister and a leading elder statesman, called for the establishment of a federal department of geriatrics. He pointed out that "Too much ability is being lost by automatic guillotine at 65." He added the "men and women over 65 are a national resource that we squander."

Generally, though, pre-retirement planning is in its infancy, and there is a lack of authoritative knowledge. Planning for retirement is like planning a career in hockey, or any other major sport: the loudest voice is not always the best guide. Sports writers and commentators appear to be expert about the sport into which the young person wants to get involved. But there is a great difference between a *talking* and a *playing* knowledge of the game. In other words, the young candidate for hockey fame would be further ahead to be coached by an experienced professional, such as Gordie Howe, than by his favorite sports analyst. Similarly, in planning for retirement, one should be coached by a man who has made a success of retirement, rather than by those who make a career of talking about it.

Almost without exception, the books and materials available on retirement (certainly by the most widely-quoted authorities) have been produced by career people studying, rather than experiencing, retirement. Superannuation is quite different from what is usually anticipated. From a distance, it looks attractive. Imagine being freed from daily tasks, imposed by others, to enter into a period of life when we do only what we want to do! This is the deceptive aspect of retirement, since the joy of sleeping in past the accustomed hour fades quickly. The retiree soon finds that no matter how tired he was of his work conditions, he can only sleep his normal complement of hours and that, in fact, as he grows older he requires less sleep.

Of course, hobbies can help fill the new hours of freedom. Fishing, golfing and other sports can satisfy part of the need for activity. The same applies to watching television. However, it has been found that a man, or woman, spends only as much time in hobbies after retirement as before. The real

problem is to fill in what was working time, purposefully and usefully and, preferably, in association with others.

High on the list of retirement priorities is health. How does one keep in condition? Obviously, much can be done to keep in shape through physical activities — to the level approved by one's physician. The family physician can be of great help through advice on how to live, but the retiree has to do the "living." What he puts into it is what counts. This involves careful husbanding of health, sensible diet, keeping down weight, and consulting with doctors and dentists, preferably on a scheduled basis.

Far too often, the focus is put on money for retirement. Income is important, naturally, but under widespread pension plans — government, company or institutional — much of the money worry of retirement has been removed. It is amazing to contemplate the resources which can be tapped.

For example, a former miner from Trail, British Columbia, was interviewed in Yuma, Arizona. He and his wife claimed to live quite satisfactorily on government pension. Each, under the liberal conditions established by the British Columbia government, received upward of \$200 a month. They had put their life savings into a lovely home and spacious grounds on which they raised fruits, vegetables and flowers. They pulled a large trailer behind their specially-equipped family car, and each autumn they drove south so the husband could enjoy desert living in Arizona. He had emphysema and found the drier climate of Arizona helpful during the winter months. They drove back to British Columbia in the early spring, in time to tend their garden.

Among the advantages of retirement was a kick-back in taxes (they paid only \$1 a year under the British Columbia rebate plan for the elderly); hospitalization at \$1 a day, medicare, pharmacare, denticare, and such other benefits as available. It would be difficult to imagine a more desirable life. (It should be noted that newcomers to British Columbia, and there are many, need a year's residence to qualify for the benefits).

But most need not leave home to enjoy retired life. Not only is there time for hobbies, sports and activities, there is more time to enjoy family life. The family still is the corner-stone of organized living and whether it be the pleasure of daily, weekly or yearly visits, much of the available pleasure of life is in the participation of family activities. This mitigates the threat of isolation, which always is present in retirement.

Should additional income be needed, the skills which have been acquired in a working lifetime can be invaluable in retirement, whether they be industrial skills or professional knowledge. A former carpenter, plumber, electrician, painter, or mechanic can be a boon for any neighborhood into which he retires. If he makes available his talents, he can be busy from morning until night.

For instance, a retired electrician from Chicago, now living in St. Petersburg, Florida, claimed there was too much to do. He had to go away for a holiday . . . The wife of a retired "handy man" found that he was being kept so busy she actually insisted in moving out of the community. She said her husband was working too much . . . Grass-cutting and gardening skills are useful in retirement communities. There's a man who cuts four lawns a day, two in the forenoon and two in the afternoon. He gets \$8 for each lawn.

All kinds of service jobs, which take little capital, are available. These include, to name but a few, repair of electrical appliances, television sets, radios, gasoline-powered mowers, sharpening of tools, rebuilding of small cars often of the imported variety, running a tea shop, or a motel. A retired salesman entered the real estate business after considerable

training. There is a variety of training programs available in the realm of adult education — such as re-upholstering classes, lapidary science and jewellery making. But university courses also are available. The University of Prince Edward Island, for instance, is offering a variety of courses free to students over 65.



apartment building. The superintendent on such a job gets free rental plus a salary. If one wants to invest a bit of capital, the returns are even better, particularly if one buys well-located and carefully-maintained rental units.

Such is the case of a retired worker in Florida. He invested his savings in four apartments backing on a golf course. At 76 years of age he wanted to retire. He was offered the apartments for some \$60,000 with just under \$20,000 as a down payment. The owner said he would have his accommodation free, with minimal duties of maintainance. Such an investment also would act as a hedge against inflation.

It is not necessary to go far afield to benefit by retirement opportunities. One couple that loved dogs set up a breeding operation at their country cottage. They raised pups and sold them at a tidy profit. Another couple, planning for retirement, bought 50 isolated and neglected acres of land for \$1,000. They planted thousands of evergreen seedlings. They explained their first crop would be Christmas trees, the next telegraph and telephone poles, and, finally, lumber. Of course, this was looking far into the future, but this is what retirement planning really is all about.

In the "good old days" there was not the same concern about retirement, because relatively few reached the retirement age. Life expectancy doubled in a period of just 100 years. Two million Canadians are 65 years and older; within 15 years there will be nearly three million. Canada has become one of the "oldest" countries in the world. By the end of the century, 11 to 12 per cent of Canadians will be 65 years of age or more, while the world average for persons over 60 years then will be only nine per cent.

Canada rightly shows concern for its elder citizens, although many claim that the present social welfare measures still are inadequate. A few figures will illustrate recent efforts to cope with this increasingly important portion of the country's population: in the past 10 years, minimum social security has gone from \$65 a month to \$187, and now is indexed to inflation. Ontario and British Columbia provide income supplements. Several provinces provide free drug supplies. Denticare was started in Saskatchewan in September, 1974. In 1970, 23,000 dwellings for the elderly were built under the National Housing Act, and today there are some 40,000 units.

Despite such efforts, the inference that the retirement years are not now satisfactory is borne out in proceedings of world, national and regional conferences on aging. A recent report by the World Health Organization found that old people are worse off comparatively in industrial countries than in underdeveloped countries where traditional support for the aged is deeply imbedded in the national cultures.

The way society looks at its senior citizens is of paramount importance in achieving the desired results in retirement. And this does vary widely from one country to another. The emphasis put on work in Russia was striking for me. So much so that factory workers who kept exercising their skills after the normal age of retirement were allowed to keep their extra earnings, income tax free.

This is true in agriculture, as in industry. I asked the manager who was the oldest worker on a very large state farm. He said there were two in their 80s, but added if I had come a few months earlier I would have found a man nearing the century mark. He performed light tasks until a few weeks before his death. A Scottish geriatrician, attending a Kiev meeting, said a man should not be considered old until he was at least 80 years of age. Russian experts disagreed with him. They said that men and women, if they lived rightly, should go beyond the century mark.

Initiative, ingenuity and natural talents come into their own during this period of life. I met a retired man in Texas who turns empty beer cans, which he receives from his friends by the hundreds, into attractive decorations. His main tools are tin-cutting shears and a pair of pliers. A more sophisticated type of employment is to become manager of an

A feature film at the Kiev meeting drew an overflow audience. The star of the film was a man 165 years of age. There were others in the film well over 100 years old — all of them still active and enjoying life. Russian experts claimed that work, proper diet and congenial atmosphere to aging, high in the mountains of Georgia in southern U.S.S.R., were the contributory factors in lengthy and enjoyable old age.

The zeal which oldsters put into modern living is attested by the number of mature bicycle riders who are especially noticeable in retirement communities. The number of "three-wheelers" pedalled around by elderly men and women, is phenomenal. I was told in one bicycle shop that manufacturers in the United States could not keep up with the demand.

Some cardiologists advocate walking, bicycling and swimming to counteract what is described as stasis (sluggish circulation of the blood) a very common complaint on this continent, particularly since the advent of the automobile. Many, in the older generation, seem to heed this advice. A wife of a lean 81-year-old veteran of World War I said her husband would rather dance than eat. He prided himself on his ability to get into his old uniform. Obviously he was determined not to get fat. He was literally having the "time of his life."

Women have their problems in retirement, and these may be expected to grow in view of the much larger proportion of women in the work force. However, one does not "retire" from housekeeping duties, and this is at once a burden and a boon. An attractive wife expressed it this way: "I married my husband for better or for worse, but not to have him home for luncheon every day." She, and millions of other wives, have had their well-established household routines disrupted by this "invasion" of the home by the retired husband. Twice as much husband and half as much income is not always the way to foster happiness among married retirees. However more consideration on the part of the husband, and the determination to develop activities outside the home for a few hours each day, can help solve that problem. "The retirement years should be the best period of life. We plan to make it so," wrote an executive of a large American institution engaged in aging research.

Upon reaching 65 years of age, there still is the expectancy, from a statistical basis, of nearly another 15 years of living — slightly less for men and a little more for women. The satisfaction one gets out of these added years depends on what one puts into them — in terms of keeping physically and mentally fit. These are the "bonus years" of life, but the dividends are not automatic. They must be won. ☐

Dave Macfarlane's studies take him around the world

There are nearly two million retirees in Canada, more than 20 million in the United States and an aggregate of 200 million around the world.

This segment of the population will be increasing faster than any other in the demographic chart, particularly with the decline of the birth rate in technologically-advanced countries.

D. B. "Dave" Macfarlane, long-time science writer with the *Montreal Star*, is attempting in this month's essay (pages 13-16), written for *The Innovators*, to find some answers to the many questions related to the social problem of retirement. Because of space limitations, the essay deals mainly with second careers and opportunities opened to the so-called Third Age, but has not attempted to cover the aspects of disabilities or chronic illness in old age which would require studies in themselves.

Mr. Macfarlane's field research work comes under the title "The Status of the Elderly in a Rapidly-Changing Technological World."

He holds a bachelor of arts degree from Sir George Williams University and a master of arts degree from the University of Montreal. He is a member of the International Association of Gerontology and is a consultant in aging to governments, industries and institutions.



His active participation in the field of retirement planning includes serving as a director of the Griffith-McConnell Home for the Aged; Montreal Senior Citizens' Forum; Lakeshore Community Services; and West Island Senior Enterprises (WISE).

He has participated in several domestic and world conferences dealing with the socio-economic problems of aging and was an accredited delegate to the First Canadian Conference on Aging, 1966, Toronto; Seventh International Congress of Gerontology, 1966, Vienna; Eighth International Congress of Gerontology, 1969, Washington, D.C.; Second White House Conference on Aging, Washington, D.C., 1971;

Ninth International Congress of Gerontology, Kiev, U.S.S.R., 1972; and the 26th annual meeting of the American Gerontological Society, Miami, 1973. A member of the McGill Medical Expedition to Easter Island, 1963-64, paying particular attention to the peculiar aspects of the aging process in these remote areas, Mr. Macfarlane now is in the fifth year of an international study of aging facilities in Canada and abroad. He has completed one book manuscript entitled *Guide to Retirement* and currently is on a European tour while completing two other books, *How to Have Fun After Sixty-Five* and *Five Years and One Hundred Thousand Miles — After Retirement*. The latter revolves around the lives of snowbirds — retirees who yearly migrate to the citrus belt of the North American continent. Mr. Macfarlane was projected into studies of aging when, as a cub reporter, he interviewed Stephen Leacock upon the occasion of the latter's compulsory retirement in 1936. The well-known humorist was asked to comment on the action of the McGill University Board of Governors and answered, "I shall save my comment until the hereafter, when I shall shout it down at them."

Most active, successful people fight the notion of retirement as a do-nothing period of life. D. B. Macfarlane outlines the results of his numerous studies and observations and also offers the benefit of his personal experience in this challenging Third Age life. ☐

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Access is the operative word for libraries

How would you like to go to a library that has no books? You enter the room to find empty space and a young woman with her welcoming smile. You see no books and you're convinced you've entered the wrong room except for the sign on the door. What is this? Book banning? Book burning?

Absolutely not. This is the new approach to library services which has been in effect at Bell-Northern Research branch libraries for the past 18 months. And it's successful.

"We are using the reference librarian in an advocacy role at BNR," says Jos. E. Carver, manager of BNR's Technical Information Centre (the new name for libraries). "Based on personal interviews with the borrowers and previous experience we determine which people need what. This knowledge allows us to give our borrowers the information they really need on a permanent basis, even forwarding unsolicited information to interested parties."

The adoption of aggressive library services began with the expansion and growth of Bell-Northern Research from the confines of one central location to five, six and seven outlets. In the past, the BNR Technical Information Centre found it necessary to provide relocated groups with "library service" in four new locations in Ottawa, then one in Montreal.

When the moves occurred, the importance and need of library services were considered great enough to think of establishing branch libraries in these locations; that is, satellite information centres which basically were miniature replicas of the central library's holdings and services.

As an alternative to branch libraries, and seeking to eliminate some of the costs, namely duplicate reference and book collections, space rental, furniture and machine acquisitions, plus clerical salaries, it was decided that professional librarians be strategically placed within the locations — "without books."

Thus, the librarian plays an interface role between the scientist, technologist or manager and the information centre. The librarian becomes an information exchange specialist, replacing the



Jos. E. Carver is manager of the Technical Information Centre at Bell-Northern Research in Ottawa

keepers and circulators of books, and becomes the access to any relevant information required.

Research scientists are an expensive commodity. Their time is valuable. Time wasted searching for material in the library is exactly that — wasted time. With more and more information being printed daily, scientists and technologists do not have time to stay abreast of everything being published in their fields. Therefore, it was felt that a professional librarian should align personally with a specific group and, through brief interviews and conversation, seek out and forward solicited and unsolicited information. In this role the librarian becomes the information exchange specialist — not relying only on his or her book collection but tapping any and every resource imaginable.

The first step was selecting and interviewing members of the scientific staff. Based upon their responses, previous requests, and so on, librarians established their interest profiles. At present, all material entering the Technical Information Centre is scanned and compared to the interest profiles. Periodicals, books, conference proceedings, clippings, calls for papers, newspapers and pamphlets are carefully scrutinized and if anything perti-

nent is discovered it is automatically drawn to the attention of those interested.

The program started in October, 1973, with 18 people. Today, the service is provided to 191 technologists, scientists and managers.

To support the hand-tailored service, a weekly current awareness publication — "Blue neo" — was started. It replaces the time-consuming routing of periodicals or photocopies of hundreds of pages. Therefore, every Friday, based upon the interest profiles, "Blue neo" (usually the material is selected tables of contents) is distributed. A person receiving "Blue neo" will find the amount of material varies from week to week.

"What we are saying," Mr. Carver explains, "is 'this material has come into the library, you should be aware of it'. Or we say, 'no material came in this week which is really pertinent to what you are doing. Don't waste your time.'"

He has found that a weekly packet will be from 3-7 pages and will generate an average of 3½ requests per subscriber. Further, he finds the "Blue neo" program draws attention to contents pages the scientists would not normally see.

Attention is drawn to the fringe areas

of the scientists' work. "We feel that this is important because the scientist or research man should be aware of the impact his work has on the environment today. The alerting services we have reveal areas outside a narrow concentration."

It was shortly after adoption of the "advocacy" program that a relocation of certain R&D staff was announced. And it was decided to implement more fully the librarian-without-a-library concept. During discussions, one scientist said "I would rather have a library without a librarian." The concept of a library as a

cialist in the field receives maximum co-operation. Every source must be tapped for information by the information exchange specialist. Every university, public, governmental and special library is the information exchange specialist's source of information. If he or she does not receive the support nor have the necessary personality and aggressive dedication to the profession, the system will not work.

As part of the tapping facilities, Bell Northern Research Technical Information Centre provides access to the information exchange services known

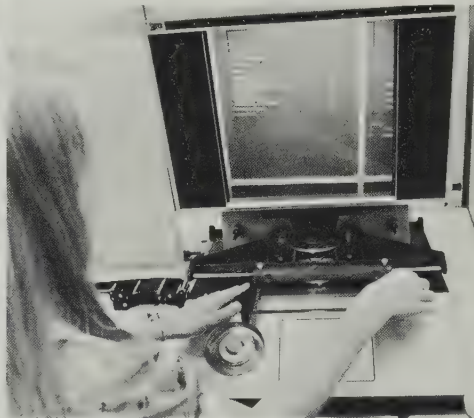
in other company locations. A phone call there will ensure long-distance retrieval and delivery within a day or two. Shorter material is photocopied and sent immediately by telecopier.

For its part, CAN/SDI provides individually-selected listings of articles of interest from current periodicals. CAN/OLE at the present time is equipped for retrospective searching in science and technology. It has made it possible to reduce average search time from eight to less than two and a half hours.

Northern Electric's head office library



In the reading room at BNR.



Judicious selection is the key phrase.



Northern Electric librarian Betty Tomas.

collection of books is hard to shake.

To aid in the acceptance of this new approach another library tenet was purposely violated. Traditionally, libraries attempt to be located centrally on main traffic routes. For BNR's purposes, 465 square feet as library were allocated in the sub-basement of the new Ottawa location known as Carling Square. In this limited area was placed a basic core reference collection and approximately 145 periodicals. Because of the location, there appeared to be no library.

The librarian left the library and moved freely throughout the building, dealing directly with managerial, technical and scientific staff. The information exchange specialist set up interviews, appointments, and discussed the information needs with the manager, technologist or scientist concerned. Based on these profile interest areas, she supplied unsolicited information to them. Comments received from a senior administrative member was "Whatever it is the library is doing, it is excellent. In some cases it has actually brought information to our attention that changed our direction of work."

With the adoption of the advocacy method, the Central Technical Information Centre or "backstop" library must ensure the information exchange spe-

as CAN/SDI (Canadian Selective Dissemination of Information) and CAN/OLE (Canadian On-Line Enquiry).

Most interesting perhaps is the retrieval system developed by BNR and named ALIRT (analytic library information retrieval and transfer). In April, 1973, managers and staff of the 18 libraries in BNR, Northern Electric, Bell Canada and Microsystems International agreed to swap information on the contents of their respective locations.

The result was the development of a common inventory, showing the holdings of each location and making it possible to expedite the library loan function at all locations. BNR was assigned the task of programming the catalog on computer and came up with ALIRT, giving each location access to 50,000 volumes by author, title, subject, series, author and title analytics, and classification number.

To take an example of how the system works for reference purposes, suppose the personnel officer in a Northern Electric plant wishes documentation on labor relations in the public service. He phones his local company library, identifies his need and a librarian checks the printout from ALIRT for pertinent volumes in the group book holdings. The librarian finds that some material is in the local library, but some books are

in Montreal, under the direction of Betty Tomas and Sheila Matheson, serves as the central technical information centre for all of Northern Electric. It is linked with ALIRT and features an SDI profile operation. Through the BNR central library, it has access to CAN/OLE.

Northern Electric libraries at Lachine, Lucerne, Belleville and London have access to CAN/OLE and are served by ALIRT. A number of employees at each of these locations have been profiled in terms of individual scientific information needs by library staff and are subscribers to SDI.

"Ideally, the objective of the advocacy system is to have all branch libraries occupy a minimum of low-cost space and contain the bare minimum of books and periodicals absolutely necessary for a given operation. They would, of course, be fully supported by central services," Mr. Carver explains. "The main tools would be a telephone, a terminal for SDI and ALIRT searching, a telecopier to move facsimiles from one location to another, and a microfilm-microfiche reader/printer. Professional library staff would go to the scientist to organize his information needs."

The idea is catching on fast among users as they interface with individual information staff. They now phone and ask to speak to "my librarian." □

\$3 million plant to be erected in Calgary

Calgary has a new Stampede happening these days — but it doesn't involve horses.

It's technology, a spin-off of an industrial growth trend created by oil. Because of it, the Alberta city has set aside the Skyline Industrial Park to house a varied blend of manufacturing facilities which reflect Calgary's changing economic character.

The park's newest tenant will be a \$3 million Northern Electric assembly plant and engineering office for SP-1 electronic telephone switching equipment. A 53,000-square-foot facility, located on 8.4 acres, it is expected to employ more than 200 people by the end of next year. Design work on the plant, which

will use raw materials, components, and services from western Canada, now is under way. Construction is scheduled to start at the beginning of 1975.

An increasing demand for SP-1 switching systems in Canada's western provinces prompted the company to build a second switching plant, and build it in the west, according to Charles G. Millar, executive vice-president, operations, of Northern Electric. Its main switching systems manufacturing plant, Bramalea, is at Brampton, Ontario.

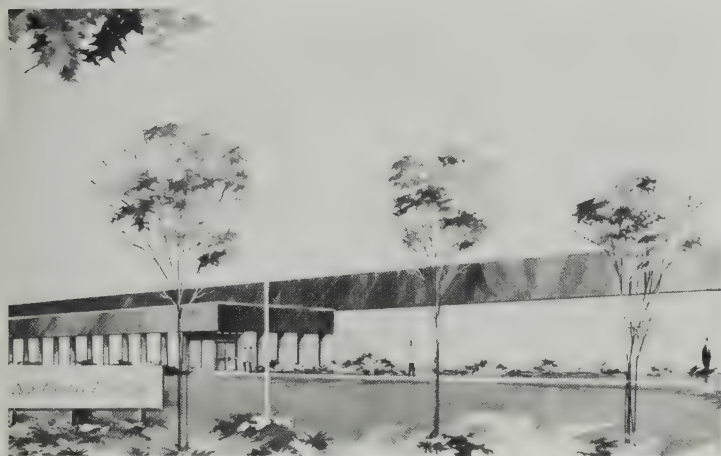
"Throughout Canada and the United States, we have installed or have orders for 100 SP-1 systems, and 28 of them are in the western provinces," Mr. Millar says. Alberta Government Telephones has led the world in adapting to the new system, with 14 either in service or on order. Manitoba Telephone System has five in service or on order, Saskatchewan Telecommunications and Edmonton Telephones each has four, and British Columbia Telephone Company

now has one on order.

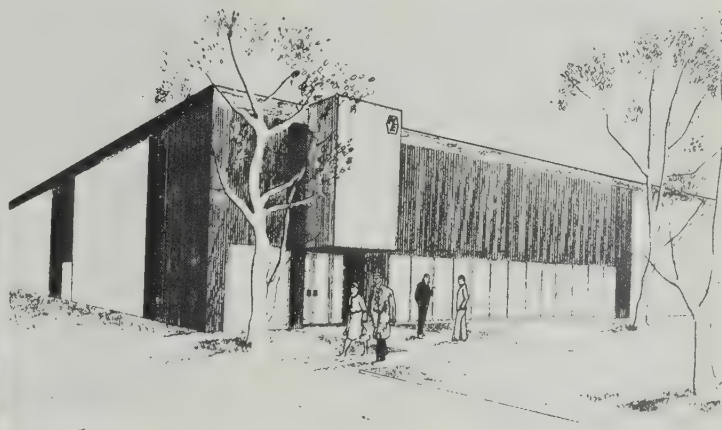
The very size of the western market has made Alberta the logical choice for the plant, which will provide Calgary with an additional high technology industry. The company will hire and train assembly operators, engineering technologists and specification writers, and professional engineers.

This is Northern Electric's second plant in Calgary. It has been operating a wire and cable plant there since 1967 — the first venture by the company in western Canada. When construction begins, the Calgary facility will be the third new Northern Electric building in the west. Factories are being constructed in Winnipeg (switching equipment components) and Regina (telephone apparatus).

The announcement to build the new plant was made in the Alberta Legislative Assembly by Hon. Roy A. Farran, minister of telephones and utilities of Alberta. ☐



Architect's drawing of the new Calgary plant.



And the same for Regina.

... and Regina is the site of expansion, too

The initiative and skills of the people who make the products often guarantee the quality of the product itself and it seems that Saskatchewan provides excellent man/woman power.

This was emphasized by speakers at a luncheon ceremony held October 16 at the Hotel Saskatchewan in Regina when Northern Electric unveiled plans for its new \$750,000 telephone assembly plant. The plant is scheduled to be completed by mid-1975.

Attending the luncheon ceremony were Regina Mayor Henry Baker, who described the pioneering role of industry and industry's work force in the city; Saskatchewan's minister of tele-

phones, J. R. Brockelbank, who spoke of the high quality of the province's manpower; and Keith Seddlemeyer, provincial deputy minister of industry and commerce.

Speaking for Northern Electric, Q. R. Ball, group vice-president, subscriber equipment, said: "Since we established our original plant in Regina, we have been very pleased with our relationship with the community, and the work performed by Regina residents. We are glad to take a greater part in the growing economy of Saskatchewan, as well as that of western Canada."

Since 1971, Northern Electric has been producing various types of telephones in Regina in a building shared with its distribution subsidiary, Nedco Ltd.

As an extension of Northern Electric's Residential Apparatus Division in Lon-

don, Ontario, the Regina operation will produce in excess of 100,000 Contempra telephone sets per year, plus such other products as the QBX-1B Buzzer and linesmen's handsets.

Production is carried out by locally-trained personnel, each employee assembling a complete telephone set, rather than working along conventional assembly lines.

General manager of the Regina plant is Robert E. Enos. A Montrealer by birth, he joined Northern Electric in 1962 at the Shearer Street plant. He moved to Regina from the Relay and Electronics Division in Lachine, Quebec.

The plant will be located at the northeast corner of Ring Road and McDonald Street on the northern border of the city. The new building, a 21,500-square-foot structure, ultimately will employ some 150 people. ☐

Northern Electric: MIDWIFE TO EARLY CANADIAN BROADCASTING

The airwaves may have crackled a bit, but you still heard it. Charles Lindbergh has crossed the Atlantic in "The Spirit of St. Louis" — the first solo flight ever between North America and Europe. And you danced the "Black Bottom" in your living-room while Paul Whiteman's orchestra played high above Times Square in the ballroom of the Roosevelt Hotel in New York.

The year was 1927, when jazz was king and milk sold for a nickel a quart. Were you around? Northern Electric certainly was — and it played a major role in that "new-fangled" medium everyone was listening to: radio. In fact, the company acted as a midwife to early Canadian broadcasting.

A few years earlier, in 1919, Canada had become the site of the world's first continuously-broadcasting commercial radio station when *CFCF*, then called *WXA*, went on the air in Montreal. Before that, Guglielmo Marconi received his first wireless message in St. John's Newfoundland in 1901. Marconi was the father of radio in that he first applied Heinrich Hertz's 1875 discovery that waves in the atmosphere could be put to commercial use.

Northern Electric, then involved almost solely with manufacturing telephones for Bell Canada, got into radio during the early 1920s. The company began manufacturing equipment used by pioneering radio stations, and from 1924 to 1944 it owned and operated *CHYC* on the seventh floor of the Shearer Street plant in Montreal. It also set up Toronto's *CHIC* in 1925, but the Montreal facility became a showcase for the portfolio of transmitters, microphones, public address systems and radio sets which the company was developing.

By 1927, Northern Electric had installed and equipped *CHSJ* Saint John; *CKY* Winnipeg; *CHRC*, *CJYC*, and *CKNC* Toronto; *CNRA* Moncton; *CNRO* Ottawa, the first of the Canadian Na-



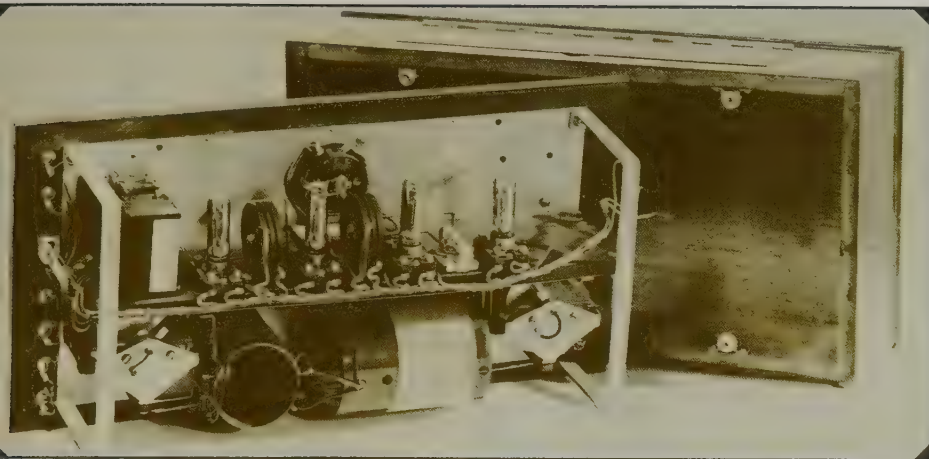
tional Railways-operated stations; *CNRV* Vancouver; as well as *CHYC* and *CHIC*. In that year, more than a score of radio stations had an audience of 250,000 licensed listeners across the country (yes, in those days, you had to pay for the privilege).

It was also in 1927 — July 1 to be precise — that Canada marked its 60th anniversary as a nation. Although radio as a medium was only eight years old, people from coast to coast took part in the jubilee celebrations by tuning into radio sets — crude by today's standards — to hear remarks from Ottawa's Parliament Hill. Northern Electric's people and equipment played a major role in that landmark broadcast.

The national broadcast was done through the joint efforts of Canada's railroad, telephone and telegraph companies, because by the mid-1920's all had interests in radio. Approximately 23 stations from Halifax, Nova Scotia to Victoria, British Columbia — and even a



1. The scene in the radio control room of Ottawa's Parliament Buildings just prior to broadcast of the Jubilee celebrations July 1, 1927.
2. Radio transmission towers near Vancouver, B.C., circa 1924.



Innards of the R2001 radio, a four-tube set, first manufactured in December, 1922.
R4L radio set with R100 cone loudspeaker, manufactured at Northern Electric's Shearer Street operations in Montreal during the early 1920s.
Prime Minister Mackenzie King congratulates the nation during Jubilee celebrations.

Detroit station which beamed to south-western Ontario — were linked to Ottawa that day by 23,000 miles of telephone and telegraph circuits.

Northern Electric's Montreal station, *CHYC*, was chosen to broadcast that city's portion of the Ottawa festivities. The company also installed and operated public address systems in Fredericton, New Brunswick; Montreal; Ottawa and Oshawa, Ontario; and Edmonton, Alberta, so that people who didn't have access to radio sets could gather in town halls and schools to hear the unique broadcast.

There were a few flies in the ointment, however. One lineman near Winnipeg discovered a break in the transmission line and contacted his supervisor about splicing the wire. He was told to take any measure not to interrupt the impending broadcast: "Hold the wire, for God's sake, if you have to, with your bare hands."

He apparently did the job, as the re-

pair was made in time to carry the live program, in which the country listened to these words:

"Good morning, ladies and gentlemen. This is Andy Ryan, *CNRO* Ottawa. With me is Jacques Cartier, *CKAC* Montreal. We're speaking to you from the master control room in the Centre Block of the Parliament Buildings for this first national radio hookup. The weather in Ottawa today for Canada's Diamond Jubilee is sultry . . ."

That afternoon and evening, Canadians and some short-wave enthusiasts scattered around the world heard Governor-General Viscount Willingdon read a message from King George V of England. They also heard from Prime Minister Mackenzie King, as well as from a special guest — Charles Lindbergh, with an account of his trans-Atlantic flight.

Considering the youth of radio, the broadcast was an incredible feat. Early radio was, after all, quite an elementary operation. Electrical discharge from transmitting equipment, for instance, was so noisy inside studios that operators had to stuff cotton in their ears during broadcasts. The invention of the vacuum tube in 1922 helped eliminate distracting noise from electrical discharges.

One Northern Electric employee, G. S. Patterson, supervised manufacture of the company's first transmitter and soon-to-be-famous "peanut tube" which also first appeared in 1922. The peanut tube was a forerunner to an eventual miniaturization trend in radio electronics that occurred a decade later.

When *CHYC* first went on the air in 1924 at Shearer Street, programming was at a level just a cut above the primitive. Norman Richards, Herbert Chadwick and Allan Cash cranked up the turntable every Wednesday afternoon for regular musical selections.

The station's program base in those experimental days came from Sunday church service broadcasting. *CHYC* took on programs from eight churches, a policy that became the station's trademark. When the 500-watt station signed off in 1928, with no plans to return, thousands of listeners sent a petition for it to resume operations.

Public response prompted Northern Electric to revive programming on a technically superior 5,000-watt station which featured much improved tonal reproduction. The original 500-watt transmitter continued its useful work at *CHNS* in Halifax.

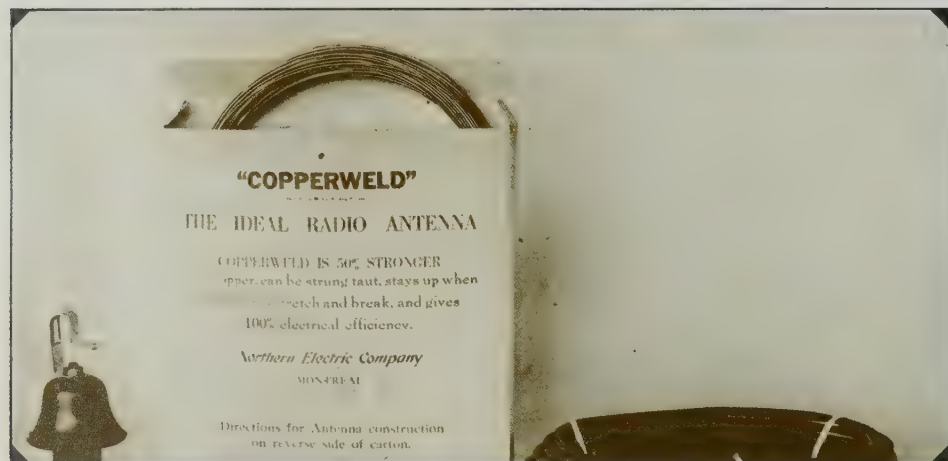
By the time of the Jubilee broadcast, radio was a precocious child — and Northern Electric was helping raise it

through its formative years by manufacturing and marketing equipment for both the industry and the consumer.

Radio was, really, the first fundamental breakthrough in communications since the printing press, and as such, was being embraced as a combined information and entertainment medium. In a country as vast as Canada, it helped break down obstacles of time and space. Also, it acted as a unifying factor in a country whose very distances created a sense of isolation known in few other nations.

Northern Electric's "ministry of the airwaves" — *CHYC* — was to continue to please the public until 1944, when it was absorbed by the rapidly-developing Canadian Broadcasting Corporation. The CBC was formed in 1936. Stuart Richardson, now associated with Montreal's *CJAD*, was at *CHYC* during the 1930s.

First peanut tube manufactured by Northern Electric in Montreal May 20, 1922.



Copperweld radio antenna, a Northern Electric radio accessory marketed during the 1920s.

Mr. Richardson has vivid memories of Dr. Lloyd C. Douglas, one of the first clergymen to use the airwaves. Dr. Douglas left the active ministry in 1933 and went on to become the author of such books as *The Robe* and *Magnificent Obsession*.

Mr. Richardson remembers Dr. Douglas as a "marvellous speaker . . . he would choose such titles for his sermons as 'Sidelights on the Moratorium', an indication we should show kindness to Germany, or 'Spiritual Cosmetics', admonishing young working women, drained of their natural coloring, to dab on a little rouge. 'Smear it on, little sister,' he'd say, 'smear it on!'"

CHYC didn't live by the Bible alone. It had its own live programs and a Canadian answer to Paul Whiteman — Lenny and his Red Jackets — who came to the country's homes directly from the ballroom of Montreal's Ritz-Carlton

Hotel. There was only one problem: the same equipment was used for all live broadcasts, which meant stuffing a cab with radio equipment, and stumbling into the lobby of the Ritz weighted down with paraphernalia.

The company first began manufacturing radio receiving sets in 1922, when it built the R-1000 unit, which was equipped with "peanut" or vacuum tubes. It remained one of Canada's major manufacturers of receiving sets until 1958, when it moved out of radio set assembly.

In making receiving sets that won consumer acceptance, Northern Electric soon became a leader. Its Baby Champ mantel radio was selected in 1948 by the National Gallery of Canada as being the best in its field.

One of Northern Electric's most significant contributions to radio was the design, construction and installation of

the master control centre for the Canadian Broadcasting Corporation in Montreal. The system helped the CBC achieve recognition as one of the world's finest radio facilities.

Cut into service in 1949, the control centre was dismantled in 1973 when the CBC moved to new premises. The former CBC building will be used by the Olympic Radio-Television Organization for the 1976 summer games in Montreal.

Some of Northern Electric's early work in radio was for the Canadian National Railways, whose original network of stations eventually became part of the core of the Canadian Broadcasting Corporation.

When Sir Henry Thornton became president of the CNR in 1922, he quickly recognized radio as a medium practically custom-made for the communications needs of the national railway. He often used radio to convey personal congratulations to employees on their safety performances, or to tell them about CNR's expansion from coast-to-coast.

CHYC took yet another pioneering step when it broadcast the first full-fledged CNR program in 1923. It was a brief address to several groups of Americans travelling by rail to the opening of Mount McKinley Park in Alaska, that went on the airwaves only months before the station actually began regular programming.

Sir Henry Thornton, meanwhile, helped spur the creation of this country's radio drama. He gave impetus to the CNR network's *Romance of Canada* historical drama series, a pacesetter which used the talents of playwrights Tyrone Guthrie and Merrill Denison, thus reinforcing their creative influence in stage and radio in both North America and the United Kingdom.

Guthrie and Denison set out to tell Canadian history in terms easily grasped by the public, rather than in traditional academic jargon. They succeeded to the point where Denison was invited to do the same job on American history for United States radio in the 1930s.

Northern Electric withdrew from radio in the late 1940s to devote more time and money to the expanding realm of telephony and later to help Canada launch the world's first domestic telecommunications satellite — Anik I, on November 9, 1972.

Depending on how you look at it, it's been both a short step and a quantum leap from crystal set to satellite. □



Pulse 120 is for better business communications

From the first day men began doing business, one of the biggest headaches must have been communicating with one another. Effectively, that is. Communications — fast, accurate, efficient communications — were, are and probably always will be the heart of business.

One of the newest, and rather spectacular, efforts in this continuing process is the Pulse 120 EPABX (120-line electronic private automatic branch exchange). This system, geared to the ever more complex needs of modern business, can be operated usefully, and profitably, by a firm that uses as few as 30 or 40 telephones. Manufactured at Northern Electric's plant in Belleville, Ontario, they already are coming off the production line and at year's end about 200 are expected to be in service.

Bell-Northern Research started investigating the Pulse system in 1968. By October, 1972 the Pulse 80, the first in the Pulse family, hit the market. Now, more than 2,000 are operating across Canada, in the United States, Norway, Ireland, Barbados — and in the offices of the president of Nicaragua. Inquiries about the system have come in from a half dozen other countries and even from an off-shore drilling outfit.

The Pulse 120 is a direct, if somewhat more sophisticated, outgrowth of the Pulse 80 — it has 40 more lines, and such additional features as code restric-



The Pulse 120 EPABX saves space, labor and time and provides increased flexibility and speed.

tion and Digitone, or push-button, and dial-Pulse conversion.

Hugh Campbell, product specialist for EPABX and a member of product manager Peter Cassidy's team in Belleville, says "We make about 45 Pulse units a week here, and add to that nearly as many by the Northern Telecom plant in Mountain View, California.

"Subscribers," says Mr. Campbell, "are very happy with the system. We've had some complaints, but little ones and far less than normally expected with a product of this type. With about 9,000 system-months' experience now and field study data coming in from BNR and the telephone companies, we now have a considerable amount of data to verify that the system is working well."

To explain: Pulse EPABX is a flexible, completely self-contained, factory-tested (66 hours of it) business communications system — that is, it's housed within the company's premises and gives both external and internal

services — which operates compatibly with the conventional telephone system. It allows the subscriber to start small and build in additional features as he needs them. It is designed to use standard, off-the-shelf transistors and digital integrated circuits.

It's called Pulse because it makes the best use of time divisional multiplexing and pulse amplitude modulation techniques. In other words, the electronic design provides superb traffic handling capacity.

Basically, the electronic systems as compared with the electromechanical ones, are lighter, save space, labor and time, and provide increased simplicity, flexibility and speed. Mr. Campbell describes some of the advantages:

- The Pulse system is much smaller than equivalent relay systems and it performs a much larger variety of services, such as access to private tie lines and to paging, dictation and WATS services.
- The electronic system needs the



Peter Cassidy, product manager for PBX (private branch exchange) equipment, left, with Hugh Campbell, product specialist at Northern Electric's Belleville plant.



This is the "clean room" at the Belleville plant which is used for the manufacture of printed circuit boards. The foreground shows the manual phase of assembling components.

space of about two filing cabinets — and that includes the power supply.

- Electronic components (a Pulse 120 holds about 14,750 of them) are like feathers compared with wire-spring relays and X-bar switches. Pulse weighs about 90 pounds per square foot compared to around 150 pounds for typical electromechanical systems.

- The Pulse system can be located virtually anywhere in an office area; no special room is needed. This, obviously, is quite a saving in the cost of floor space, and a welcome touch of flexibility.

- Circuit packs are selected and simply plugged into the central control shelf. According to product manager Peter Cassidy, it's like "super-market shopping."

- Pulse saves time, and thus money, in labor costs. (1) It takes five hours to assemble and check out a Pulse in a pre-assembly shop as against 20 hours for the other system. In fact, it is so simple it is often done at the installation site. This is because all the circuit boards and shelves merely need plugging in. (2) Station class service, or the servicing of the various functions an individual telephone set is allowed to carry out, formerly involved complicated wire strapping; now it's merely a matter of pushing a diode pin into a block on a circuit board. (3) Maintenance is immensely simplified by substitution of printed circuit boards. A simple language flow chart for the service man to follow directs the operation, instead of the intricate schematic diagram.

Mr. Campbell says a maintenance man with normal PBX-key background can install and maintain a Pulse system after one week's training. (By the way, no special tools are needed.) It took four weeks for the older system. He says the board, or console, is so simple it takes no more than a half hour to familiarize an operator with it.

The compact, dark blue Pulse 120, like the Pulse 80, fits into the decor of virtually any office. So, too, with the sleek, ivory console with faceplates in dark blue, brown or green which takes up no more than a corner of the receptionist's desk.

Northern Electric has produced a batch of comprehensive manuals, sales booklets and product bulletins on the Pulse 120. They've been written with immense enthusiasm. Hugh Campbell backs them unequivocally. "Those brochures," he says, "don't lie." **o**

Ernest Hillen



Congratulations on the very interesting story on Amherst in the September issue.

Before my twin and I were born, and prior to World War I, my family lived in Amherst and a railway station sign proclaimed to transients that they had arrived in "BUSY AMHERST." It was a prospering town in those days, according to the many stories I have heard.

The article was of particular interest to me because Amherst was one of the four towns in which my dad pioneered the telephone business. I think too little credit is given those pioneering individuals and their extreme dedication. (My father's name was M. P. MacKinnon — known as "M.P.")

After gaining experience with A. T. & T. in Boston where he walked from town to town with a pack on his back repairing lines (not even a bicycle to ride), dad joined the Eastern Telephone Co. (1901) then operating in Glace Bay, Nova Scotia and became local manager. The telephone switchboard was in my mother's house and she was the sole operator at first.

Dad went to Amherst in 1908 and was appointed manager of the Cumberland Telephone Co. Dad told us many times of going from door to door in Amherst telling people of the wondrous new invention — the telephone — and asking them to take service. Again, the switchboard was in my family's home, and my mother operated it.

Maritime Telephone and Telegraph was not organized until 1911 and through this company dad was transferred to Antigonish/Guysborough where he was district superintendent and pioneered these locals. He lived in Antigonish until his death at age 91.

Dorothy Trainor
Deux Montagnes, Que.

I want to express thanks for your thoughtfulness in sending a complimentary copy of *The Innovators* to me.

The article concerning the opening of the new Northern Electric plant in Amherst (September, Vol. 1, No. 4) is most interesting and informative. The people of Amherst are very happy to have such a fine company moving to its area, and becoming fine corporate citizens of the community.

The churches of Amherst certainly wish every success for the new plant, and hope that the community and the corporation will work together for the mutual benefit of both parties. Your magazine certainly is an excellent example of how your company wishes to communicate how it tries to operate within the locality it is situated. It is done well, and is truly appreciated by the citizens.

The opportunity to be involved in the opening of the Amherst plant was a privilege.

Rev. Roger H. Prentice
President
Amherst Ministerial Association
Amherst, N.S.

After reading issues 1 and 2 of Volume 1 of your magazine, I am pleased to let you know how much I appreciated it.

Yours is a well-illustrated publication dedicated to communications. Furthermore, it largely covers the human aspect of Northern Electric, the people who make it and the readership you wish to reach.

Both professors and students of our college will benefit from the technical information you put at the disposal of those who are not specialists in this field.

Jean-Pierre Lussier
Director
Bibliothèque du Collège de Montréal
Montréal

Thank *The Innovators* for taking some of the mystery out of telecommunications.

But, please, won't you explain the explanations? When you tell me that a CCD is a "charge-coupling device", remember that a "device" can mean almost anything and that "charge-coupling" is not in the average dictionary. It's probably asking a great deal from your highly-qualified technical writers, but won't you help the rest of us join your electronic age?

Anne Bichay
Pointe Claire, Que.

In *The Innovators*, certain technical statements appear intended for experts. Why not increase their intelligibility by adding an explanatory sentence or a very simple sketch?

Also, in this educational vein, why not occasionally publish articles on the basics of one of the major systems making up the Northern American Telecommunications networks? I think this could become very popular.

M. A. Théault, Eng.
Technical and Cultural Liaison Manager
Northern Electric
Montreal

(We are making a concerted effort to make telecommunications as comprehensible as possible in all material published in *The Innovators*. Let us know after another issue or two whether we're being successful. Incidentally, we do have an article on charge-coupled devices scheduled for an upcoming issue. Ed.)



Charlie Baillie: Football hobbyist

Mention the name Charlie Baillie and some people think of one of the country's top college football coaches, while others think of a manager in Northern Electric's headquarters personnel team. Both are right.

For two-and-one-half months this fall, Baillie doubled his responsibilities at Northern Electric with those of coaching football at McGill University in Montreal. For the first two weeks of the football season in September, Charlie Baillie bounded out of bed at the unlikely hour of 4:15 A.M. and drove off to McGill Stadium where he led 55 football players through a six o'clock practice session.

By 7:30 he was behind his desk at Northern Electric's Montreal headquarters. Nearly 10 hours later, he headed back to McGill to run the players through an evening workout. That over, he returned to his suburban Dollard-des-Ormeaux home for some sleep.

For those who can remember back to the Montreal Alouette football teams of the late 1950's and early 1960's the name Charlie Baillie might be familiar. He spent six years with the Canadian Football League club and one each with the now-defunct Quebec Rifles and Montreal Beavers, playing three different positions before a knee injury sidelined him as an active player in 1967.

After one year away from football, Mr. Baillie accepted a post at McGill as an offensive line coach. He stayed there for three years and then moved to his alma mater, Sir George Williams University, for two years, also as an offensive line

coach. In 1972 — McGill football fans call it their salvation — Charlie Baillie took over as head coach of the McGill Redmen and proceeded to lead them to their first winning season in three years; only their second in the last 12.

Last year, in his second season as head coach, the team went undefeated through the regular season, a feat McGill athletic director Harry Griffiths can't recall in the university's modern history. After copping the Quebec University league championship, Mr. Baillie took his team to Western Canada where they upset heavily-favored University of

team is not so surprising in view of his background — football has virtually been a way of life.

Born in Westmount in 1935, he grew up with a football-playing father in the days when football at McGill was a major drawing card in Montreal. Charlie, and brother Ray who is an assistant coach with the McGill Redmen, grew up with football the way most children grow up with toys.

By the time he was in high school, young Charlie was participating in track, football and hockey. After graduating from high school he went to work at odd



Manitoba 16-0 in a playoff game to advance into the Canadian college championship against St. Mary's University of Halifax, Nova Scotia. Although McGill lost that game 14-6, there was no doubt the team's showing under Mr. Baillie was the best the university had seen in recent years.

This year the Redmen moved into a new and tougher league against old rivals Queen's University in Kingston, the University of Toronto, and the University of Ottawa. The league is far more competitive than last year's Quebec University Athletic Association. That factor, along with the loss of some key players from last year's roster gave the Redmen only three victories in eight games this season.

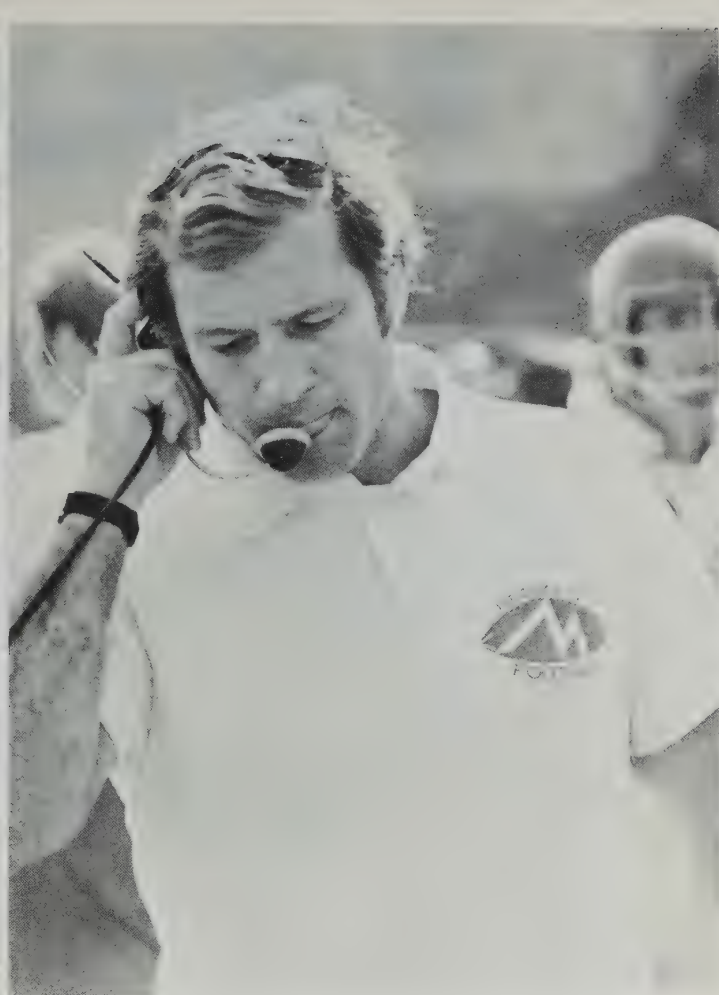
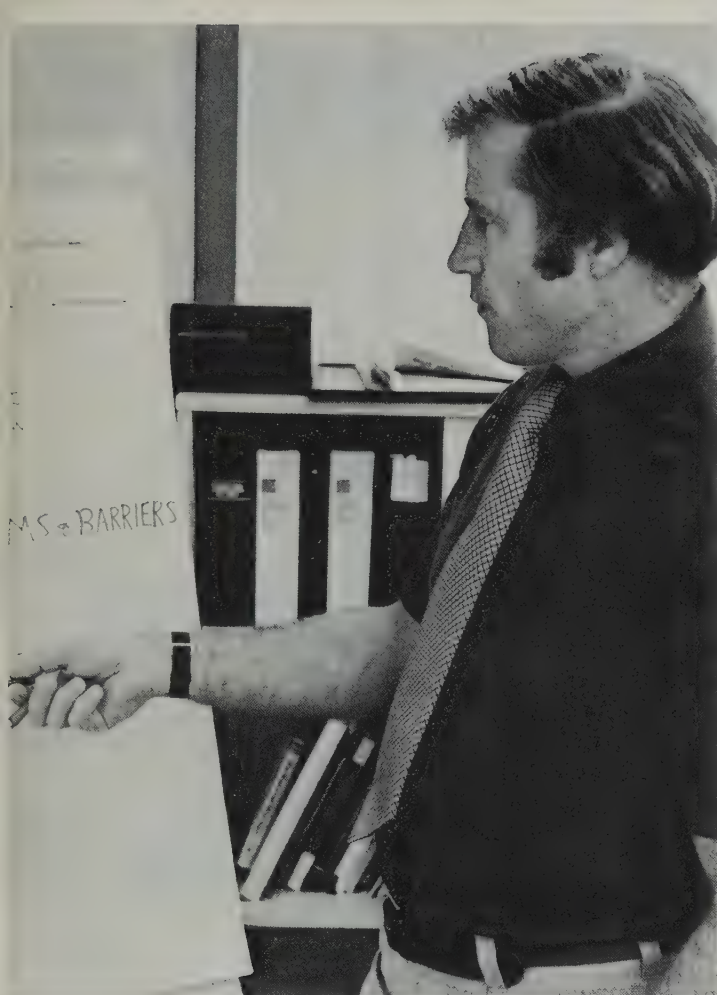
Mr. Baillie's success with the McGill

jobs for three years.

Deciding to go back to school, he spent a year at Ohio State University, then returned to Montreal and received his arts degree from Sir George Williams University in 1959.

Immediately after graduation, Mr. Baillie joined Northern Electric's work measurement and methods department at the Shearer Street plant in Montreal. That same year he married Alyce O'Connor, one of a family of 14 children from a small Ontario town called Apple Hill. The Baillies now have five children of their own — Sharon, 15; Steven, 13; Scott, 10; Peter, 8; and Christine, 4.

From work measurement and methods, Mr. Baillie moved to international operations and then to manufacturing and engineering before assuming



duties in the headquarters personnel organization in Montreal.

How does he find the time for a full-time career on the one hand, and a hectic coaching job on the other?

"It's all a matter of effectively managing your time," says Mr. Baillie. "You have to be well organized in whatever you do. I try to keep both jobs completely separate. In other words, football can't interfere at all with my job at Northern Electric. I ask people not to call me at work regarding football unless it's absolutely an emergency."

Despite managing his time as effectively as possible, some things do suffer. "Something has to give when you put in an 18-hour day. For some people, it could be their health." He's not referring to himself. At six feet and 210 pounds, Baillie, who plays a lot of handball in the off season, looks as fit off the football field today as he did on it 10 years ago.

"In my case," he says, "I think my leisure time has suffered. I really don't have too much of it at all, so I guess that's one of the sacrifices I've made. My family doesn't see me as often as I'd like them to either, so perhaps you could say my family life suffers a little,

even though we try to make it up in other ways. But it's difficult. The key to it is to be organized and to plan well. I think a lot of people know that when they're dealing with me I get very impatient if things take too long to get done."

Working at Northern Electric in such areas as labor contracts and benefit programs is a task of some pressure, but pressure is something he has come to know while playing professional football.

"I guess one has to enjoy pressure situations," says Mr. Baillie. "I have plenty of pressure in both my jobs, to get things done quickly and effectively. When the end of the day at Northern Electric comes, I have an hour to prepare for a practice involving between 55 and 60 people, including players, managers, and trainers. We have to sort things out in a very short period of time, so the pressure is great to get first things done first." This decision-making procedure is in keeping with Baillie's theory of "getting the job done and done right."

On the football field, Charlie Baillie does not go it alone, of course. He has five assistant coaches who are, as he puts it, "a tremendous asset to the

team." They include brother Ray, who, aside from a few extra pounds, is a double of Charlie.

"At McGill," says Mr. Baillie, "we rarely attract the ready-made football player, so one of our major objectives is to develop them, not only as football players but as individuals, something that can be applied to Northern Electric as well."

While large crowds have not been regular fare at McGill football games for the past several years, things improved somewhat this time around. This year marked the 100th anniversary of the first football game ever played in North America when McGill and Harvard took the field back in 1874 and a large alumni turnout helped get attendance back to a respectable level.

When the Redmen went onto the field in October at McGill Stadium against the University of Toronto Blues, they wore helmets with a "100" imprinted on them to commemorate the anniversary of college football. Charlie Baillie had whipped the team into top condition, doing, as McGill athletic director Harry Griffiths still says, "one helluva job."

Aaron Rand

If your toll-ticketing limit...

SP-1 with automatic toll-ticketing can save you money... and make you money.

Time was when free-standing ticketing systems were the best you could buy.

Times change. So do standards of accuracy, and flexibility. That's why you should take a close look at SP-1, with CAMA/LAMA, before you spend any money on new ticketing equipment.

For a start, if an extension of your present system would cost in the \$250,000 range, you can apply up to 70% of that to the cost of the SP-1, since the CAMA/LAMA capability itself only costs about 30% of such a free-standing system extension.

Second...once you have made this initial investment there are no other costs for additional automatic message accounting equipment as your office grows.

Third...you'll drastically reduce your maintenance costs and simplify your procedures. Paper tapes and punched cards are eliminated.

Fourth...you'll make more money, because SP-1 is accurate. It eliminates bad data, which in some systems tested resulted in revenue understatement up to 25%. Its increased precision of timing, accurate to within one second, again increases income, and minimizes customer complaints.

The SP-1 using magnetic tape gives

you complete validation of all data, duplication of tape units and a record of all operational measurements. With over 250,000 calls on one tape.

SP-1 can be supplied with LAMA for your 2 Wire office, CAMA for your 4 Wire office, or LAMA/CAMA for your combined local/toll office.

SP-1 with automatic message accounting on magnetic tape is the modern approach to toll ticketing, but there's nothing new about its basic appeal.

It'll save you money, and it'll make you money.

We can show you how, if you simply call or write your nearest Northern Telecom Office.



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a Northern Electric Company

Northeastern: 525 Executive Blvd., Elmsford, N.Y. 10523, (914) 592-3434

East Central: 5706 New Chapel Hill Rd., Raleigh, NC 27607, (919) 851-6130

Southeastern: 4934 Distribution Drive, Tampa, FL 33619, (813) 247-4475

Southwestern: 2225 Belt Line Rd., Carrollton, TX 75006, (214) 242-0622

Central: 2951 Higgins Rd., Elk Grove Village, IL 60007, (312) 437-2370

Pacific: 1106 Broadway, Santa Monica, CA 90401, (213) 451-8623

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PULSE 120

Even your comptroller will love it.

If your comptroller's like ours, he really loves a beautiful balance sheet. That's why he'll light up when he takes a look at the profitability of our PULSE* 120 electronic PABX. It cuts as beautiful a figure on your P&L statement as it does in your subscriber's reception area.

The PULSE system grows right along with your customers. You can start small and build up to as many as 120 lines. And you can add extensions, trunks and features as

fast as you can plug in a circuit board. In fact, we used plug-in boards throughout the system to cut your service time (installation, re-arrangement and maintenance) way down.

The Northern Telecom PULSE 120 electronic PABX. Its uniqueness lies in its compactness, its total flexibility, its ease of servicing — and its ability to put a smile on your comptroller's face.



For more information, get in touch with the Northern Telecom regional office nearest you.

- NORTHEASTERN: 525 Executive Blvd., Elmsford, N.Y. 10523, (914) 592-3434
- MID ATLANTIC: 5706 New Chapel Hill Rd., Raleigh NC 27607 (919) 851-6130
- SOUTHEASTERN: 4934 Distribution Drive, Tampa, Fla. 33619, (813) 247-4475
- SOUTHWESTERN: 2225 Belt Line Rd., Carrollton, Texas 75006, (214) 242-0622
- CENTRAL: 2951 Higgins Rd., Elk Grove Village, Ill. 60007, (312) 437-2370
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- HEAD OFFICE: 140 Federal St., Boston, Mass. 02110, (617) 482-0995



**NORTHERN
TELECOM** 
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DEC 23 1974

C O N T E N T S

Items of reference on Northern Electric are attached in the order indicated and under the following headings:

1. Fact sheet
2. Northern Electric: Canada's leading telecommunications supplier
3. Northern Electric: A growing Canadian international company
4. Northern Electric in Ontario
5. Northern Electric: Product categories
6. Bell-Northern: A leader in telecommunications R & D
7. Northern Electric: A chronology of significant company events
8. Northern Electric: Operating management -- biographical profiles

News Release

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FACT SHEET

Northern Electric Company, Limited is Canada's largest manufacturer of telecommunications equipment with plants, service centres, warehouses and sales offices from coast to coast. A multinational corporation, it has manufacturing subsidiaries in Canada, the United States, Turkey, Ireland and Malaysia, as well as sales subsidiaries in several countries. It also exports around the world telecommunications systems, equipment and components made in its Canadian plants. Northern Electric's head office is located in Montreal.

HISTORY: Through predecessor companies, Northern Electric traces its origins back to 1882 in Montreal. Northern Electric Company, Limited as such was incorporated by Federal charter in 1914. It became a publicly held company in December, 1973 when approximately 10 percent of its common shares were offered to Canadian investors. Bell Canada holds the remaining 90 percent.

SALES Consolidated sales of Northern Electric and its subsidiaries for
& the first half of 1974 totalled \$460 million, an increase of 77
EARNINGS percent over the same period in 1973. Consolidated net earnings

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were \$28.8 million for the six months, up from \$6.9 million.

Annual consolidated sales for 1973 were \$613 million, with net earnings of \$32 million.

EMPLOYEES: At mid-1974, there were more than 27,000 persons employed in company and subsidiary operations.

SUBSIDIARIES:

Nothern Telecom, Inc. Head office: Boston, Mass.

Northern Electric Company (Ireland) Limited. Head office:
Galway, Ireland

Northern Electric Telekomunikasyon, A.S. Head office:
Istanbul, Turkey

Northern Electric (Asia) Limited. Executive office: Hong
Kong

Northern Electric (Europe) N.V. Head Office: Amsterdam,
The Netherlands

Northern Electric (International) N.V. Head office:
Amsterdam, The Netherlands

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Microsystems International Limited. Head office: Montreal,
Quebec

Microsystems International GmbH, Germany

Microsystems International Inc., U.S.A.

Microsystems International Sendirian Berhad, Malaysia

Nedco Ltd. Head office: Montreal, Quebec

Zenith Electric Supply Limited, Toronto, Ontario

Nevron Industries Company Limited. Head office: Montreal,
Quebec.

AFFILIATED COMPANY:

Bell-Northern Research Ltd. Head office: Ottawa, Ontario

MANUFACTURING LOCATIONS: (Northern Electric and subsidiaries)

CANADA

Newfoundland:

St. John's: Telephone switching system components.

Nova Scotia:

Halifax: Repeater frames, associated networks for telephones.

Amherst: Telephone key sets, electronic telephone equipment.

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New Brunswick:Saint John: (2 plants) Telephone assembly.Repair and overhaul of telephones,
switching systems.Moncton: Electronic instrument repair and calibration.Quebec:Lucerne: Communications satellite electronics, assembly-
line production of communications satellite
platforms.Lachine: (4 plants) Wire and cable for communications and
power.

Outside plant hardware.

Relays and electronic components.

Power and test equipment.

LaSalle: Switchboards and switching systems.Montreal: (2 plants) Telecommunications components,
plastic mouldings.

Metal products.

Montreal North: Repair, overhaul and service of
telecommunications equipment.St. Laurent: Multiplex, radio and carrier transmission
equipment.

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O n t a r i o:

Ottawa: Semiconductors, including integrated circuits,
and similar products for computer and telecommuni-
cations industries.

Kingston: Wire and cable for communications and power.

Belleville: Electronic switchboard and key equipment.

North York: Repair, overhaul and service of telecommunications
equipment

Brampton (Bramalea plant): Electro-mechanical, electronic
switching systems.

London: Subscriber telephone sets and apparatus; business
communications systems.

M a n i t o b a:

Winnipeg: Telephone switching system components.

S a s k a t c h e w a n:

Regina: Telephone set and apparatus assembly.

A l b e r t a:

Calgary: Wire and cable for communications and power.

Total manufacturing floor space, Canadian operations: 4.5 million sq. ft.

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UNITED STATESC a l i f o r n i a:Mountain View: Business communications systems.F l o r i d a:West Palm Beach: Printed circuit boards for electronic apparatus.M i c h i g a n:Port Huron: Telephone sets and apparatus, key systems.N e w H a m p s h i r e:Concord: Transmission test equipment and products.N o r t h C a r o l i n a:Butner: Electronic switching equipment.

Total manufacturing floor space, U.S. operations: 260,000 sq. ft.

OVERSEAS:

T u r k e y: Switching equipment, associated power supplies and
switchboards; telephone sets.

I r e l a n d: Components and products for telephone equipment
and electronic private automatic branch exchanges.

M a l a y s i a: Integrated circuit assembly.

Total manufacturing space, overseas operations: 150,000 sq. ft.

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PRODUCT CATEGORIES:

- Subscriber products (telephone sets)
- Business communications systems
- Telephone company central switching offices
- Wire and cable
- Transmission products

OUTPUT:

In the 10-year period from 1964 to 1973, Northern Electric and its subsidiaries produced:

210 billion conductor-feet of wire and cable
8 million telephone sets
35 million channel-miles of microwave
3 million lines of crossbar switching
350 thousand lines of electronic switching
600 thousand private exchange branch lines

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NORTHERN ELECTRIC:

CANADA'S LEADING TELECOMMUNICATIONS SUPPLIER

Northern Electric Company, Limited is Canada's main manufacturer of telecommunications equipment and one of the largest in the world. An international corporation, it has manufacturing subsidiaries in Canada, the United States, Turkey, Ireland and Malaysia, as well as sales subsidiaries in several countries. It also exports telecommunications systems, equipment and components made in its Canadian plants to customers around the world.

Established in 1882, Northern Electric employs more than 27,000 men and women in its own and subsidiary operations. The company develops, designs and manufactures all the principal elements required for modern telecommunications -- the telephone itself, and the vast network of transmission and switching systems needed to operate it; communications components for satellites and ground stations; and wires and cables for both power and communications.

The company operates in eight Canadian provinces, with 24 plants and two service centres occupying over 4.5 million sq. ft. of floor space. Subsidiary operations in Canada, the United States, Turkey, Ireland and Malaysia have nine plants and six laboratories with a total of more than 500,000 sq. ft.

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Northern Electric's total operations are directed by John C. Lobb, chairman and chief executive officer, and Walter F. Light, president and chief operating officer. Charles G. Millar is executive vice-president, operations. Reporting to Millar are: Quentin R. Ball, group vice-president, subscriber equipment, responsible for business communications systems and apparatus, and repair and overhaul; Ewart O. Bridges, group vice-president, switching, responsible for the company's switching operations; Kenneth H. Woodley, group vice-president, cable, outside plant and transmission, responsible for operations which manufacture wire and cable, outside plant hardware and transmission equipment.

Northern Electric's ability to sell successfully in both domestic and foreign markets reflects its capability for technological innovation and new product development. The SP-1 family of computer-controlled, stored-program electronic switching systems features system standardization that reduces inventory and simplifies maintenance, offers local and long-distance switching capabilities, and is suitable for data switching.

The award-winning Contempra telephone marked a breakthrough in design, with modular construction and easily accessible parts facilitating maintenance. The Contempra line features rotary dial, pushbutton dial and no-dial versions. The Venture I lightweight headset weighs less than an ounce, with a miniature microphone based on the electret principle. It maintains the speaker's voice at uniform levels and cancels out background noise. The Centurion single-slot public telephone is designed to blend in with any decor, and comes equipped with a vandal-resistant housing.

Northern Electric achievements in the field of space communications have included design of ground tracking stations, manufacture of components

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for satellites, and supplying of electronic assemblies for communications spacecraft. The company has the only commercial communications satellite electronic platform assembly line in the world.

In its efforts to remain abreast of continuing scientific advances and in developing new technologies and new products, Northern Electric is backed by Canada's largest industrial research and development organization, Bell-Northern Research Ltd. This has given the company the ability to create the new products required in today's ever-expanding telecommunications market, to design equipment and systems specifically suited to the different technical specifications of international markets and to modify products where necessary.

CANADIAN MANUFACTURING OPERATIONS

Atlantic Provinces:

Increasing demand for telecommunications equipment in this region led to the establishment of two new plants in 1974, one at St. John's, Newfoundland, the other at Moncton, New Brunswick. A third was officially opened at Amherst, Nova Scotia.

St. John's is the site of a telephone switching system components plant. Repeater frames and associated networks for telephones are produced at Halifax, while telephone key sets and electronic telephone equipment are manufactured at Amherst. The new Moncton plant is engaged in electronic instrument repair and calibration. There are two facilities at Saint John, New Brunswick, one handling telephone assembly, the other dealing with repair and overhaul of telephone sets and switching systems.

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Quebec:

At Lucerne, Quebec, near Hull, Northern Electric owns and operates the only assembly-line facilities in the world for the production of electronic platforms for commercial communications satellites. The Lucerne plant manufactures and assembles electronic equipment for satellites, as well as digital transmission equipment for telecommunications.

Northern Electric manufacturing operations in Quebec are concentrated mainly in the metropolitan Montreal area, which is also the site of the head office of the company and of three subsidiaries -- Nedco Ltd., Microsystems International Limited, and Nevron Industries Company, Limited.

Two plants are located in the City of Montreal proper, and manufacture telecommunications components, plastic mouldings and metal products. Four separate operations at Lachine produce wire and cable for communications and power; outside plant hardware; relays and electronic components; and power and test equipment.

The plant at LaSalle produces switchboards and switching systems. Repair, overhaul and service of telecommunications equipment is carried on at Montreal North. A St. Laurent facility manufactures multiplex, radio and carrier transmission equipment.

Ontario:

Northern Electric is an important presence on the Ontario industrial scene, with a variety of manufacturing activities.

The Bramalea Works at Brampton is the company's largest single operation and manufactures electro-mechanical and electronic switching products. At North York, repair and service of telephone sets and associated equipment is effected.

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Electronic switchboard and key equipment is produced at Belleville, the first plant established by the company outside Quebec, and wire and cable for communications and power are manufactured at Kingston. The London plant produces subscriber apparatus and business communications systems.

Western Canada:

The Winnipeg plant, which manufactures telephone switching system components, is the site of a major expansion to meet customer requirements. The Regina operation carries out telephone set and apparatus assembly, and a new plant is being built to expand production to 100,000 telephone sets a year. Wire and cable for communications and power is manufactured at the recently-expanded Calgary plant. A second plant is to be built in Calgary in 1975 to manufacture electronic switching systems.

CANADIAN SUBSIDIARIES

Distribution:

Nedco Ltd., a subsidiary of Northern Electric engaged in the national distribution of industrial, electrical and electronic products, handles more than 15,000 products purchased from over 200 Canadian manufacturers, with Northern Electric supplying about 20 percent of the total. Major customers are electrical contractors and industry in general.

Formerly an operating division, Nedco was incorporated in 1972 as a separate organization with headquarters in Montreal, and is now one of Canada's largest industrial and electrical distributors. Nedco and its main subsidiary Zenith Electric Supply Limited, of Toronto, have a staff of almost 1000 in 55 sales offices and distribution centres in 42 Canadian cities.

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Microelectronics:

Microsystems International Limited was established in 1969 as a Northern Electric subsidiary specializing in the manufacture of semi-conductors, including integrated circuits, and other products for the computer and telecommunications industries. Head office is in Montreal, and the main research, design, development and manufacturing is carried out in Microsystems' Ottawa facilities. This company is equipped with a broad range of highly specialized production equipment, and has complete development laboratories for new products and processes, and possesses facilities for quality control, product testing and reliability services.

CANADIAN AFFILIATE:

Bell-Northern Research, a jointly owned subsidiary of Northern Electric and Bell Canada, ranks among the top one percent of research organizations in North America. With an annual budget in excess of \$40 million it carries on its activities in six Canadian locations. Head office and principal laboratories are in Ottawa.

BNR is engaged in a wide variety of scientific and technological undertakings, ranging from investigations of the structure of physical matter to the design of telephone exchange equipment, and from the future requirements of an individual telephone customer to the provision of high-capacity communications systems to serve whole populations. Specific areas of activity include memory technology, optical communications, computer systems technology, communications transmission, switching technology, mechanical systems, digital transmission, reliability engineering, hybrid technology, systems engineering, human engineering and industrial engineering.

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NORTHERN ELECTRIC:

A GROWING CANADIAN INTERNATIONAL COMPANY

Northern Electric Company, Limited, Canada's main manufacturer of telecommunications equipment, is now one of the largest in the world with manufacturing subsidiaries in the United States, Turkey, Ireland, and Malaysia, as well as trading and sales subsidiaries in several countries. In addition, it exports telecommunications systems, equipment and components made in its Canadian plants to customers around the world.

While maintaining its role as a leading supplier in world markets, Northern Electric has dramatically changed its international business orientation. In a few short years, the company has moved from the concept of a traditional exporting organization to that of a modern international corporation with manufacturing facilities in those countries which offer the greatest potential for expansion.

Because it already served some 70 percent of the Canadian telecommunications field, Northern Electric concluded that its future and growth had to be equated with the development of non-Canadian markets, many of which require the establishment of domestic manufacturing subsidiaries. Conditions in some overseas markets dictate the introduction of local manufacturing facilities or business relationships with existing suppliers.

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Through its international subsidiaries, Northern Electric is now one of the few non-resource based or non-resource oriented Canadian manufacturing enterprises successfully reaching international markets through on-site production. This is enabling the company to gain access to the burgeoning worldwide telecommunications market.

There are currently 338 million telephones in operation around the world, and estimated requirements are for 20 million new sets each year. The United States alone added more than 7 million to its existing total of 132 million sets in 1973. For each new telephone installed, telecommunications companies spend over \$1,000 in associated equipment.

Turkey:

Northern Electric took its first step on the road to becoming an international organization in 1967 with the establishment of a plant in Turkey by a new subsidiary, Northern Telekomunikasyon A.S. (NETAS) with head office in Istanbul. This subsidiary is jointly owned by Northern Electric and the Post, Telegraph and Telephone Administration of the Republic of Turkey. Production includes crossbar switching equipment and associated power supplies and switchboard positions, as well as telephone sets. Floor area is 120,000 sq. ft.

The initial contract called for Northern Electric and NETAS to engineer, supply and install telephone equipment which included 202,400 telephone lines and 190,000 new telephones sets. A current five-year contract commits Northern Electric to provide \$36 million in Canadian telecommunications products and services to the Turkish telephone system.

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United States:

Northern Electric formed a United States subsidiary, Northern Telecom, Inc., in 1971 in a determined bid for a substantial share of the world's largest single telecommunications market. Northern Telecom established a plant in 1972 at Port Huron, Michigan, to manufacture telephone sets, apparatus and key systems. Demand has since necessitated the building of a new facility of 30,000 sq. ft., more than double the original plant area. Northern Telecom has added a 92,000 sq. ft. plant at Butner, North Carolina to produce electronic switching equipment, and a 40,000 sq. ft. plant at Mountain View, California, for the manufacture of electronic private branch exchanges.

In 1973, Northern Telecom acquired Northeast Electronics Corporation of Concord, New Hampshire, which designs, manufactures and sells electronic communications test equipment. Recently, it began manufacturing transmission equipment. This facility has since been more than doubled in size, to 52,000 sq. ft.

In 1974, Northern Telecom purchased the assets of AVM Florida, Inc., a West Palm Beach manufacturer of printed circuit boards for electronic apparatus. The 50,000 sq. ft. plant provides capacity in the United States to meet Northern Telecom's increasing requirements for this product.

Europe:

Northern Electric made its first move to become a manufacturing entity in the European Economic Community with the formation in May 1973 of a subsidiary in Ireland to produce components and products for telephone equipment and electronic private automatic branch exchanges. Northern Electric Company (Ireland) Limited now operates from a plant in Galway with 32,000 sq. ft.

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of floor area.

Two Netherlands-based international subsidiaries were established in September 1974. Northern Electric (Europe) N.V. was formed to coordinate sales, marketing and manufacturing activities of the parent company in Europe. Northern Electric (International) N.V. is a holding company for many of Northern Electric's non-Canadian assets. Both companies have head offices in Amsterdam.

Asia:

August 1974 saw the formation of Northern Electric (Asia) Limited, a trading company with sales offices in Singapore and executive offices in Hong Kong, to market telecommunications products made by Northern Electric Company, Limited and subsidiary operations. Northern Electric (Asia) is also purchasing materials and components required in other company operations.

Earlier in 1974, Northern Electric made its first direct sale to the People's Republic of China, involving multiplex radio equipment. Prior to that, the company was awarded a contract to supply Contempra telephone sets to a Venezuelan company, its first major sale to the South American market. An order from the French government telephone authority for Contempra telephones was filled the previous year.

Microelectronics:

Microsystems International Limited, Northern Electric's microelectronics subsidiary, further adds to the international dimension.

A 24,000 sq. ft. assembly plant at Penang, West Malaysia, is operated by Microsystems International Sendirian Berhad, a wholly owned subsidiary incorporated by Microsystems in 1972. Microsystems International Inc. was organized in 1972 to provide marketing and sales facilities for Microsystems

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products in the United States. Microsystems International GmbH was set up in 1970 to provide marketing and sales services in Europe and in the Common Market. It is located in West Germany.

All non-Canadian operations are backed by Northern Electric's research, manufacturing and marketing capability, and a large volume of the materials, components and replacement parts required in these activities are manufactured in the company's Canadian plants. Northern Electric will continue to supply and service a large number of international customers directly from Canadian operations.

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NORTHERN ELECTRIC

IN ONTARIO

From the time it established its first sales and service office in Toronto in 1908, Northern Electric Company, Limited has become an increasingly important presence on the Ontario industrial scene. More than 11,000 men and women are employed by the company in six manufacturing plants and in various subsidiary operating centres throughout the province. Floor space for these activities totals more than 2.1 million square feet.

In its Ontario manufacturing facilities Northern Electric produces a full range of telephone switching systems -- electronic, electro-mechanical, toll and data switching; business communications systems, including key telephone equipment, business interphone and intercom, and automatic call distributors; telephone sets and related equipment for every possible use; telecommunications and power wire and cable in varying sizes and types; and telecommunications components ranging from relays, crossbar switches, reed relays, resistors and capacitors to plugs, jacks, lamps, magnetics and printed circuit boards. Products manufactured in the province are sold in Canada and abroad.

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- 2 -

Northern Electric has three major operating centres in or near the Toronto metropolitan area, which together employ more than 5300 people. One of the company's largest single plants, the Bramalea Works, is located at Brampton where some 3850 employees are engaged in the manufacture of electro-mechanical and electronic switching products. Floor area is 746,000 sq. ft. At North York, repair and service of telephones and associated equipment is carried on by 450 people in a plant area of some 97,000 sq. ft. The Lakeshore Drive site employs about 300 people in engineering and warehousing activities and is the central reporting base for some 800 field installation personnel; this 110,000 sq. ft. centre also houses distribution facilities of Nedco Ltd., a Northern Electric subsidiary which operates sales offices and distribution centres throughout the province.

Zenith Electric Supply Limited, a Toronto-based electric wholesale distributor with 11 branches and 250 employees in Ontario, is a subsidiary of Nedco Ltd.

Electronic switchboard and key equipment is produced at Belleville, where Northern Electric established its first Ontario manufacturing unit in 1948. The plant gives employment to over 1350 people and occupies 220,000 sq. ft. of floor space. The company manufactures wire and cable for telecommunications and power in its 500,000 sq. ft. plant at Kingston, where employees number about 750. Subscriber apparatus and business communications systems are produced in the 423,000 sq. ft. London plant which employs about 2150 people.

Microsystems International Limited, a Northern Electric subsidiary which manufactures semiconductors, including integrated circuits, and other similar products for the computer and telecommunications industries, has its

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- 3 -

main research, design, development and manufacturing facilities in Ottawa. Floor area is 110,000 sq. ft. and employees total 1250.

In all its activities, and particularly in the areas of technological innovation and new product development, Northern Electric is backed by Canada's largest telecommunications research and development organization, Bell-Northern Research, which ranks among the top one percent of research organizations in North America. Jointly owned by Northern Electric and Bell Canada, BNR employs some 1750 people. The head office and the 310,000 sq. ft. principal laboratories of this Northern Electric affiliate are located in Ottawa.

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NORTHERN ELECTRIC:PRODUCT CATEGORIES

As an integrated, multi-product organization, Northern Electric Company, Limited develops, designs and manufactures all of the principal elements required for modern telecommunications -- the telephone itself, together with the vast network of transmission and switching systems needed to operate it; communications components for satellites and ground stations; and wire and cable for both power and communications.

Subscriber Products:

Canadians, for generations, have identified Northern Electric with the telephone set they use so often in their daily lives. More recently, millions of people in other parts of the world are using sets manufactured by Northern Electric or one of its subsidiaries.

Northern Electric manufactures telephone sets compatible with all North American telephone systems and networks; it modifies sets, or manufactures them specifically, for foreign markets.

Products include conventional dial telephone, key telephone sets and push-button telephones that can also serve as computer input units. Contempra sets and Centurion coin telephones are manufactured to meet established needs as well as provide flexibility with low maintenance costs.

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The Logic unit, a new concept in telephone and data sets, provides plug-in facilities for accessories such as loud-speakers and electronic answering equipment. Companion handsfree units, introduced in 1973, are designed for both the home and business market.

Northern Electric manufactures telephone sets in various shapes, sizes and colors: for homes and offices, for noisy and hazardous locations; for the hard-of-hearing; for police and fire emergency systems.

Business Systems:

Northern Electric makes a variety of business communications equipment to meet the requirements of small and large enterprises. This equipment includes data systems, key telephone systems, intercom systems, cordless switchboards, manual or private automatic branch exchanges and other specifically designed instruments.

Some of the company's key telephone systems are designed exclusively for the needs of small business, while other key systems are engineered to meet larger requirements. The compact and modular design Pulse, a fully electronic private automatic branch exchange introduced in 1972, is enjoying significant market success both in Canada and the United States, while a new and larger model is also receiving wide acceptance.

Telephone Company Central Offices:

The act of making a phone call is so simple the telephone customer has little occasion to reflect on the intricate and sophisticated physical network which makes it possible.

Northern Electric manufactures a wide range of the central office

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switching equipment required for this purpose. Step-by-step electro-mechanical systems are produced to expand systems installed as long as 50 years ago. The company also supplies modern crossbar systems, first introduced in 1954, for both expansion and new requirements. More recently, Northern Electric developed a family of advanced electronic switching systems designed specifically for the needs of both small and large communities to meet the requirement of greater flexibility at low cost to the user. The first SP-1 electronic switching system of the SP-1 family of stored-program computer-controlled electronic switching systems was put into commercial service late in 1971, with the 26th such system installed by mid-1974. An additional 80 SP-1 systems are on order. The first U.S. installation went into service in June 1974 at North Ridgeville, Ohio.

Wire and Cable:

After telephone sets, perhaps Northern Electric's most visible identification is in the large-diameter reels used to carry its cable products.

The company manufactures wire and cable for telephone operating companies as well as the electrical power industry, with products ranging from telephone wires to high-capacity communications transmission cable. Northern Electric also operates its own rod rolling mill.

Power cables, composite coaxial cables, switchboard cables, pulp-insulated exchange cables and polyethylene-insulated cables are manufactured in a large variety of sizes.

Newer developments in this area include the moisture and water resistant Migrabloc telephone cable for buried installation and the trailing

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power cable for dry-land and submarine uses.

The company also manufactures the outside plant hardware needed for the installation of wire and cable, including terminals and closures, buried peg locators, loading devices, protectors, heat coils, backboards and cases.

Transmission Products:

Northern Electric produces a wide range of high-performance transmission systems to meet the rapidly evolving needs of modern communications transmission. These systems include multiplex, microwave radio, cable carrier and line equipment.

The company's MA-5 multiplexer combines up to 2700 voice channels on a single transmission path, while Northern Electric's new RA-3 microwave radio family of six models for long-haul, heavy-route microwave systems is helping to meet advanced telecommunications needs. RA-3 microwave radio systems are being installed at the present time in the United States for Western Union Telegraph Company and in Canada for Alberta Government Telephones. The first major installation of Northern Electric's LD-4 digital coaxial cable carrier system, which provides 20,000 two-way voice channels on a 12-tube coaxial cable, is being effected on the new, high-capacity Montreal-Ottawa-Toronto communications link. In addition, Northern Electric's VF-300 unified voice frequency equipment represents a completely new line of VF products for central exchanges, and features a unified module and shelf design.

Using experience gained in the design of ground tracking stations and satellite studies, the company has become associated with a number of space projects. Northern Electric supplied communications equipment for the INTELSAT IV satellite series and for ANIK, the Canadian domestic satellite.

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The company is also providing equipment for United States domestic satellite systems, including four communications platforms for Western Union Telegraph Company and three for American Satellite Corporation. At its Lucerne, Quebec plant Northern Electric has the only commercial communications satellite electronic platform assembly line in the world.

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News Release

For use at any time

DEC 23 1974

BELL-NORTHERN:

A LEADER IN TELECOMMUNICATIONS R & D

Bell-Northern Research is Canada's largest telecommunications research and development organization, and ranks among the top one percent of research organizations in North America, spending in excess of \$40 million annually. It is the research arm of Northern Electric Company, Limited.

Having operated as a communications and systems engineering group since the turn of the century, and as the Northern Electric Laboratories since 1958, Bell-Northern Research became a corporation in its own right in 1971, jointly owned by Northern Electric and Bell Canada.

Bell-Northern carries out research, design, development, long-range planning and systems engineering in all fields of telecommunications; a continuing objective is to enable telephone companies to offer optimum communications services to subscribers at the lowest possible cost.

The scientific staff embraces a wide range of disciplines, including electrical, civil and mechanical engineering, physics, chemistry, psychology, metallurgy and mathematics. Among the 1750 employees, there are more than 700 engineers and scientists who are engaged in a wide spectrum of activities, ranging from investigations of the structure of physical matter to the design of telephone exchange equipment, and from the future requirements of an individual telephone subscriber to the provision of high-capacity

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communication systems to serve whole populations.

The company has six locations, five of them, including the central laboratory and head office, in the Ottawa area. These operations conduct work on switching development (including electronic switching), systems engineering, research on materials and processes, apparatus development, transmission development, and reliability engineering. A branch laboratory at Brampton (Bramalea), Ontario is engaged in development of electro-mechanical switching systems for telephone central offices. A new laboratory is being established at Nun's Island, Montreal, to conduct telecommunications systems studies for Bell Canada and Northern Electric.

In addition, Northern Electric itself is concerned in a number of operating locations with research and development in the fields of telephone sets, transmission equipment and components, wire and cable, private branch telephone exchanges, outside plant apparatus, and various communications components.

Using \$25 million worth of facilities and equipment, Bell-Northern has been responsible for such achievements as the electret microphone, the Contempra dial-in-hand telephone and the SP-1 electronic switching system. With a citation for "exploratory research in solid state physics and ferrites", BNR is the only Canadian organization to be honored with the Industrial Science Achievement Award given once a year by the American Association for the Advancement of Science to recognize outstanding technological achievement.

Systems originating in the company's laboratories are manufactured by Northern Electric for the needs of Bell Canada and 50 other leading telecommunications companies across Canada and around the world.

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News Release

For use at any time

DEC 23 1974

NORTHERN ELECTRIC:

CHRONOLOGY OF SIGNIFICANT EVENTS

- 1882 Manufacturing branch established by the Bell Telephone Company of Canada in leased premises at 530 Craig street, Montreal.
- 1886 Moved to Warden-King Building - 641 Craig street.
- 1891 Factory constructed at 371 Aqueduct street.
- 1895 Northern Electric and Manufacturing Company, Limited incorporated as separate company under Dominion charter replacing manufacturing branch. Authorized capital \$50,000.
- 1899 Bell purchased Barrie and Johnson Manufacturing Wire and Cable company with premises at 589 St. Paul street, Montreal. New company incorporated under Quebec charter as The Wire and Cable Company. Authorized capital \$100,000.
- 1900 The Wire and Cable Company moved to 8 Beaver Hall Hill. Northern Electric and Manufacturing purchased The Bell Company's manufacturing facilities on Aqueduct street.
- 1901 400 shares of The Wire and Cable Company stock sold by Bell to Western Electric Company.

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- 1901 Authorized capital for The Wire and Cable increased to \$1,000,000.
- 1902 Operations of The Wire and Cable Company transferred to new plant at 241 Guy street.
- 1903 Additional manufacturing space established at Guy street plant bringing total to 86,000 sq. ft.
- 1904 Northern Electric and Manufacturing acquired property at Guy and Notre Dame streets.
- 1905 Manufacturing facilities transferred from Aqueduct street to new site.
- Further additions to The Wire and Cable plant increased total floor area to 207,000 sq. ft.
- 1906 Additional buildings erected by Northern Electric and Manufacturing at Guy and Notre Dame streets. Offices and all manufacturing transferred from Aqueduct.
- Northern Electric and Manufacturing sold issue of capital stock valued at \$200,000 to Western Electric Company.
- 1907 Winnipeg selected as site for first Northern Electric and Manufacturing sales office.
- 1911 Additional block of Northern Electric and Manufacturing stock, valued at \$104,000, sold to Western Electric Company, reducing Bell Telephone Company holdings to 50 percent.

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- 1911 Imperial Wire and Cable Company, Limited incorporated under Dominion charter to acquire the assets of The Wire and Cable Company.
- 1913 Northern Electric and Manufacturing and Western Electric signed agreement governing reciprocal purchases and exchange of patents.
- 1914 Northern Electric Company, Limited incorporated under Dominion charter, as a consolidation of Northern Electric and Manufacturing Company, Limited and Imperial Wire and Cable Company, Limited.
- Construction of Shearer street plant in Montreal began.
- 1915 Administrative and manufacturing activities of Northern Electric Company, Limited consolidated in newly completed Shearer street works.
- 1919 Employee pension and benefit fund set up.
- 1929 Shearer street plant expanded from four to eight storeys.
- 1935 Dominion Sound Equipment Limited established as wholly owned subsidiary to supply and service sound equipment to movie theatres.
- 1946 Construction of plant undertaken at Lachine, Quebec for the manufacture of wire and cable for telecommunications and power. Building completed in 1947.

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- 1947 Construction began at Belleville, Ontario of plant to manufacture electronic switchboard and key equipment. Completed in 1948.
- 1958 Northern Electric Company, Limited head office moved to present location, 1600 Dorchester Boulevard West, Montreal.
- 1959 Northern Electric Laboratories established to coordinate company activities in telecommunications research and development.
- 1960 Annual sales exceeded \$250 million.
- Plant opened at London, Ontario for the manufacture of telephone sets and apparatus.
- Telephone apparatus repair and overhaul facility inaugurated at North York, Toronto.
- 1962 Northern Electric became wholly owned subsidiary of The Bell Telephone Company of Canada, through purchase by Bell of outstanding Northern Electric shares held by Western Electric Company.
- Fully automated copper rod rolling mill added to Lachine wire and cable plant.
- 1963 Bramalea works opened at Brampton, Ontario to manufacture control office switching systems.

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1965 Advanced Devices Centre established in Ottawa for the manufacture of integrated circuits.

1966 Plants opened in Saint John, New Brunswick for light electronic assembly, and in Calgary, Alberta for the manufacture of wire and cable products.

1967 Facility established in Montreal North for repair and service of telephones and associated equipment.

Plants established in Halifax, Nova Scotia and Winnipeg, Manitoba for light electronics assembly.

Northern Electric Company, Limited organized Northern Electric Telekomunikasyon, A.S. (NETAS) as a manufacturing subsidiary owned jointly with the Post, Telegraph and Telephone Administration of the Republic of Turkey. Located in Istanbul, NETAS produces telephone and switching equipment for Turkey's internal telecommunications system.

1969 Advanced Devices Centre in Ottawa incorporated as Microsystems International Limited, a wholly owned subsidiary.

1970 Northern Electric annual consolidated sales exceeded \$500 million.

Initial offering of Microsystems International Limited common shares made to Canadian investors.

Plant established by Northern Electric at Lucerne, Quebec to produce satellite electronics and transmission assemblies.

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1970 Construction began on Northern Electric plant at Kingston, Ontario to produce wire and cable for telecommunications and power. Plant in operation in 1971.

1971 Northern Telecom, Inc. incorporated as wholly owned U.S. subsidiary to manufacture and sell telecommunications equipment in the United States.

Northern Electric and Bell Canada formed Bell-Northern Research Ltd., Canada's largest industrial research and development organization, as joint subsidiary to carry out extensive continuing research and development in all aspects of telecommunications.

Plant established by Northern Electric at Regina, Saskatchewan for telephone set and apparatus assembly.

1972 Northern Telecom, Inc. opened its first manufacturing unit, a plant at Port Huron, Michigan to produce telephone sets, apparatus and key systems.

Nedco Ltd. established as Northern Electric subsidiary to distribute industrial, electrical and electronic equipment on national basis in Canada.

Microsystems International Limited opened plant at Penang, West Malaysia to produce integrated circuit assemblies.

1973 Northern Telecom acquired Northeastern Electronics Corporation of Concord, New Hampshire, a manufacturer of power and test equipment. NEC plant expanded.

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1973 Northern Electric formed Irish subsidiary, Northern Electric Company (Ireland) Limited, with manufacturing facilities at Galway to produce telephone sets and electronic automatic switchboards, components and sub-assemblies for sale in European Economic Community countries.

Developments of four new plants underway in Montreal area. First of these, the power and test equipment facility at Lachine, went on stream in mid-year.

Construction began on plant at Amherst, Nova Scotia to produce key sets and electronic telephone equipment.

Construction began on Northern Telecom electronic switching production facility at Butner, North Carolina, and a new electronic business systems manufacturing plant established at Mountain View, California. New plant established at Port Huron.

Northern Electric Company, Limited made initial public offering of common shares to Canadian investors.

1974 Calgary wire and cable plant of Northern Electric expanded.

Sale of 5000 Contempra telephone sets to Venezuela marked breakthrough by Northern Electric in South American market.

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1974 Northern Telecom, Inc. acquired AVM Florida, Inc., a manufacturer of printed circuit boards.

Northern Electric held first annual public meeting of shareholders.

Company completed first direct sale of multiplex radio equipment to People's Republic of China.

Northern Electric extended its manufacturing capability to an eight Canadian province through establishment of pilot plant at St. John's, Newfoundland.

Amherst, Nova Scotia, plant began production. Official opening ceremony held in August.

Three new plants started up in Montreal area: St. Laurent, transmission; Lachine, relay and electronics; LaSalle, switchboard and switching.

Construction began on new plant in Winnipeg to manufacture switching equipment components.

Three international subsidiaries established: Northern Electric (Asia) Limited, with head office in Hong Kong; and Northern Electric (International) N.V. and Northern Electric (Europe) N.V., both with head offices in Amsterdam, The Netherlands.

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1974 Repair and overhaul centre established at Moncton,
New Brunswick.

Northern Telecom's first SP-1 installation in the United States went into service at the North Ridgewood, Ohio central office of The Elyria Telephone Company.

Construction began on new Northern Electric plant in Regina to expand production of telephone sets to 100,000 per year in that city.

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NORTHERN ELECTRIC:

DEC 23 1974

OPERATIONS MANAGEMENTBIOGRAPHICAL PROFILESJOHN C. LOBB, Chairman of the Board and Chief Executive Officer

Prior to becoming chairman of the board of Northern Electric Company, Limited in August 1974, John C. Lobb had been directing the total operations of the company as president since 1971. He was elected chief executive officer in October 1973.

Before joining the company, Mr. Lobb held top executive positions with a number of major Northern American and international business and industrial organizations, including Crucible Steel Company, Pittsburgh, Pennsylvania, of which he was president and chief executive officer, and International Telephone and Telegraph, New York, of which he was executive vice-president.

A native of Minneapolis, Minnesota, Mr. Lobb, 61, graduated from the University of Minnesota and earned a law degree at the University of Wisconsin.

WALTER F. LIGHT, President and Chief Operating Officer

Walter F. Light has been president and chief operating officer of Northern Electric Company, Limited since August 1974.

A native of Cobalt, Ontario, where he received his early education, Mr. Light, 51, attended Queen's University, after overseas service with the RCAF and graduated with an honors degree in science in 1949. He joined Bell Canada's engineering department that year. After

holding a variety of managerial positions in Toronto and Montreal, he was appointed area plant manager, Toll Area, in 1961 and area plant manager, Toronto Area, in 1964.

In 1956, he became general operations supervisor, plant, and the next year was appointed vice-president, engineering. He was named vice-president, operations in May 1969 and executive vice-president, operations, in September 1970, the position he held at the time of his election to the presidency of Northern Electric. Mr. Light is a director of The Royal Trust Company.

CHARLES G. MILLAR, Executive Vice-President, Operations

Charles G. Millar, executive vice-president, operations, joined Northern Electric Company, Limited in Montreal in 1947, and having been assigned to increasingly responsible positions in a variety of Northern Electric locations, was named vice-president, switching in July 1972. He was appointed to this current post in October 1973.

Mr. Millar, 47, a native of Montreal, holds a degree in chemistry from McGill University. He is also a mechanical engineer.

QUENTIN R. BALL, Group Vice-President, Subscriber Equipment

Quentin R. Ball, group vice-president, subscriber equipment, is responsible for Northern Electric Company, Limited operations in the area of station apparatus, business communications systems, and repair and overhaul activities. He reports to the executive vice-president, operations. Mr. Ball, 55, was born in Regina and graduated from the University of Toronto.

With Northern Electric since 1940, he has held a number of senior engineering, manufacturing and executive positions.

EWART O. BRIDGES, Group Vice-President, Switching

Ewart O. Bridges, group vice-president, switching, is responsible for switching operations for Northern Electric Company, Limited. He reports to the executive vice-president, operations. Born in Toronto 51 years ago, Mr. Bridges joined Northern Electric as vice-president, corporate planning in June 1969 following a career in international telecommunications.

KENNETH H. WOODLEY, Group Vice-President, Cable, Outside Plant and Transmission

Kenneth H. Woodley, group vice-president, cable, outside plant and transmission for Northern Electric Company, Limited is responsible for operations related to wire and cable, outside plant hardware and transmission. He reports to the executive vice-president, operations. A native of Belleville, Mr. Woodley, 45, joined the company in 1948, and has served in senior accounting, control and manufacturing capacities.

WILLIAM J. PARDY, Vice-President, Cable

William J. Pardy, vice-president, cable, is responsible for the production and marketing of Northern Electric Company, Limited wire and cable for telecommunications and power. He supervises operations at company plants in Lachine, Quebec, Kingston, Ontario, and Calgary, Alberta. Mr. Pardy, 52, joined Northern Electric in 1946 and has served in senior

capacities in engineering, research and development, and manufacturing. He makes his headquarters in Lachine.

WILLIAM T. SIMPSON, Vice-President, Transmission

William T. Simpson, vice-president, transmission, is responsible for all Northern Electric Company, Limited operations related to transmission products, which include microwave radio and voice frequency transmission systems, coaxial cable carrier systems and communications satellites. Mr. Simpson, 53, joined Northern Electric in 1945 and has served in senior engineering responsibilities. His headquarters are in Montreal.

ELLIOTT TURCOT, Vice-President, Switching

Elliott Turcot, vice-president, switching, for Northern Electric Company, Limited, is responsible for switching sales, installation, quality and contracting operations, the electro-mechanical and electronic switching divisions, and the relay and electronic plants formed from the Shearer street operations in Montreal. Mr. Turcot makes his headquarters in the company's Bramalea plant at Brampton, Ontario. Since he joined the company in 1949, Mr. Turcot, 52, has held a number of senior positions in engineering and manufacturing.

DAVID G. VICE, Vice-President, Business Communications Equipment

David G. Vice, vice-president, business communications equipment, is responsible for Northern Electric Company, Limited production and marketing of private automatic branch exchanges, switching equipment for key telephone sets, and equipment for data communications. Divisional activities are centered in Northern Electric plants at Belleville and London, Ontario, and Amherst, Nova Scotia. Mr. Vice, who joined the company in 1955, has also served in senior capacities in the research and development field. He makes his headquarters in London.

C. WILLIAM ANDREWS, General Manager, Repair and Overhaul Division

C. William Andrews, general manager, repair and overhaul division, is responsible for Northern Electric Company, Limited activities connected with repair, overhaul and modification of products associated with the telephone industry. Operations are carried out either on-site or at divisional plants in Montreal North and North York (Toronto). Mr. Andrews, 49, joined the company in 1951 and has served in a variety of senior capacities. He makes his headquarters in Montreal North.

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ANDRE J. BOUTIN, General Manager, Business Apparatus Division

André J. Boutin, general manager, business apparatus division, is responsible for the manufacture of key systems, key telephones and associated apparatus. A Montrealer, Mr. Boutin joined Northern Electric Company, Limited in 1957 and served in senior engineering capacities. Prior to his new appointment, he was director of electronic circuit pack manufacture. Mr. Boutin makes his headquarters at the company's London, Ontario plant.

MENDEL C. COHEN, General Manager, Central Office Supply Products Division

Mendel C. Cohen, general manager, central office supply products division for Northern Electric Company, Limited, is responsible for the spare parts division and power and measurement products, as well as the metal products and switching products plants formed from the components division. Mr. Cohen, 55, who joined Northern Electric in 1955, has held a number of senior positions in inventory and materials control, engineering and production. He is based in Montreal.

VERNON A. GRAHAM, General Manager, Electro-Mechanical Switching

Vernon A. Graham, general manager, electro-mechanical switching, is responsible for Northern Electric Company, Limited manufacturing and marketing of electro-mechanical systems for central office switching equipment. Division headquarters are located in the Bramalea plant at Brampton, Ontario. Mr. Graham, 52, joined Northern Electric in 1947 and has held senior engineering and production positions.

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RONALD A. HUNTER, General Manager, Electronic Switching Division

Ronald A. Hunter, general manager, electronic switching division, is responsible for the manufacture and marketing of electronic switching equipment and systems produced by Northern Electric Company, Limited. Divisional headquarters are in the Bramalea plant at Brampton, Ontario. Mr. Hunter, 47, has served in senior accounting, control and manufacturing positions with the company.

ROY MERRILLS, General Manager, Power and Measurement Products

Roy Merrills, general manager, power and measurement products division, directs operations of Northern Electric's power and measurement products plant in Lachine, Quebec, where he makes his headquarters. Since he joined the company in 1957, Mr. Merrills, 40, has served in senior engineering, production and manufacturing capacities.

JAMES M. STEPHEN, General Manager, Switching Installation

James M. Stephen, general manager, switching installation division, is responsible for installation in Canada of Northern Electric Company, Limited electronic and electro-mechanical switching equipment and systems for central telephone offices. Divisional headquarters are in the Bramalea plant at Brampton, Ontario. Mr. Stephen, 52, joined the company in 1953 and has held senior positions in engineering, contract administration and installation.

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MARC T. STRINGER, General Manager, Outside Plant Division

Marc T. Stringer, general manager, outside plant division, is responsible for the manufacture and marketing of Northern Electric Company, Limited hardware used in the installation and connection of wire and cable. Prior to joining Northern Electric in August 1973, Mr. Stringer, 45, had wide marketing, administrative and executive experience, particularly in the wire and cable field. He makes his headquarters in Lachine, Quebec.

SUBSIDIARY EXECUTIVESNORTHERN TELECOM, INC.

RICHARD F. DOYLE, President, Northern Telecom, Inc.

Richard F. Doyle is president of Northern Telecom, Inc., the fast-growing wholly owned U.S. subsidiary of Northern Electric Company, Limited. Northern Telecom manufactures a broad range of telecommunications products in its own plants and markets the complete line of Northern Electric products in the United States. Named to his present position in March 1974, Mr. Doyle was previously executive vice-president, finance for Northern Electric. Before joining the company in 1972, he was senior vice-president, administration and finance of Allied Products, a large Chicago-based company, and had previously been partner in a major accounting firm for 16 years.

THOMAS R. WORTHY, Executive Vice-President, Marketing,
Northern Telecom, Inc.

Thomas R. Worthy has been executive vice-president, marketing of Northern Telecom, Inc. since June 1974. He coordinates the marketing of production from Northern Telecom plants in Port Huron, Michigan, Butner, North Carolina, and Mountain View, California, as well as from subsidiary plants in Concord, New Hampshire, and West Palm Beach, Florida. He joined Northern Telecom from Stromberg-Carlson Corporation where he was vice-president, marketing. He had previously held senior positions with General Dynamics Corporation. Mr. Worthy is located at the Boston head office.

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EARL B. MATHEWS, Executive Vice-President, Marketing - Nedco Ltd.

Since his appointment as executive vice-president, marketing in March 1974, Mr. Mathews has been responsible for the marketing of thousands of industrial, electrical and electronic products distributed across Canada by Nedco Ltd. His headquarters are located at the company's Paré street head office in Montreal. Before joining Nedco Ltd., Mr. Mathews was manager, physical distributions plans and operations for the housewares division of General Electric Company in the United States, with whom he had spent his entire previous business career.

MICROSYSTEMS INTERNATIONAL LIMITED

H. LLOYD WEBSTER, President, Microsystems International Limited

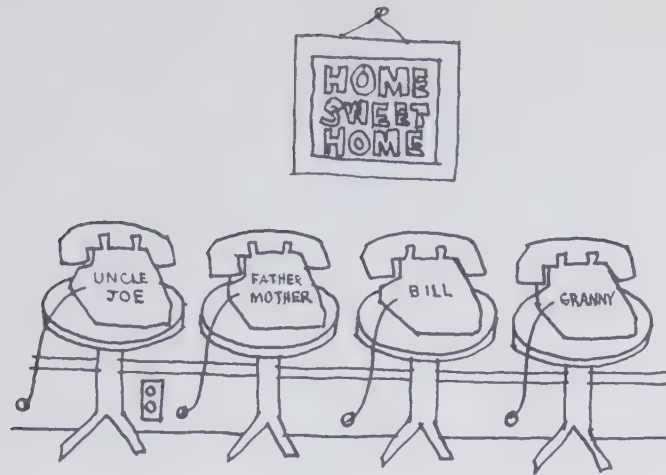
H. Lloyd Webster is president of Microsystems International Limited, a Northern Electric Company, Limited subsidiary specializing in the manufacture of semiconductors, including integrated circuits, and other products for the computer and telecommunications industry. An electrical engineer, he joined Bell Canada in 1947, moving to Northern Electric Laboratories in Ottawa as director of switching development in 1966. Prior to his latest appointment, Mr. Webster, 49, was executive vice-president, development, for Bell-Northern Research.

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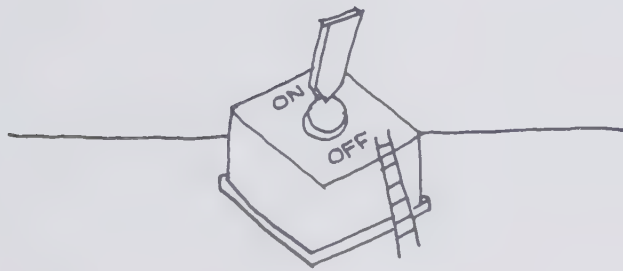


switching
yesterday
today
and tomorrow

switching—yesterday, today and tomorrow



Alexander Graham Bell's invention of the telephone was a major milestone in the history of communications. Suddenly, conversation with someone miles away became immediate and personal, and required no skill beyond the ability to speak and understand a common language. All that was required was a single pair of wires with a telephone at each end.



Simple, but a long way from what we expect of a telephone today—the ability to communicate from any telephone to any other, located in any town or country around the world.

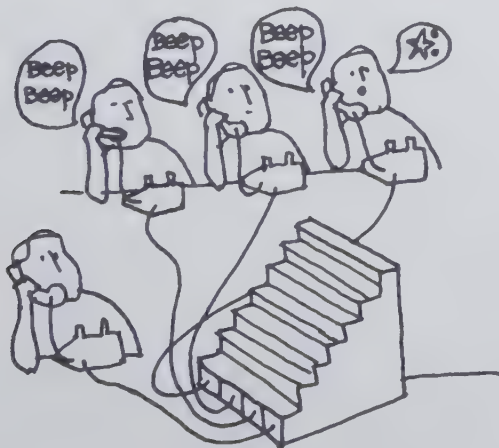
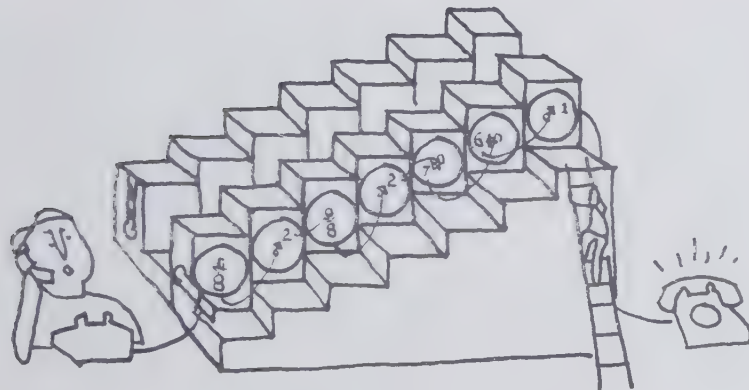
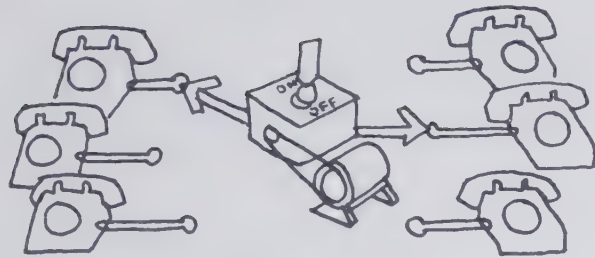
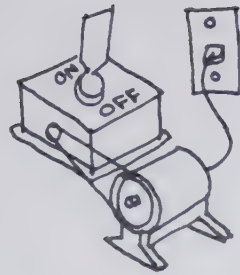
To provide access to all other telephones by individual and separate hook-ups would be out of the question. Every subscriber would require a telephone and a line to connect it to every other telephone, and the result would be a massive layer of telephones and wire five miles deep over the surface of the earth. Hardly a practical approach! However, world-wide telephone service is a reality today, and switching has made it possible.

Bell, by inventing the telephone, gave us a new means of communication. Switching made it a practical means.



In the earliest days of switching, telephones were connected to a centrally located switchboard controlled manually by a friendly telephone operator. This concept added a whole new dimension to telephone service; not only could subscribers talk to anyone else in town, they got a lot of fringe benefits as well—news, weather, you name it. In fact, telephone service for those early subscribers was so good we've been trying to match it ever since. However, with the explosive expansion that has taken place in communications usage, it would now need millions of operators to look after switchboards if we depended on operator switching. Again, not very practical!

For obviously good and practical reasons, then, automatic switching has become a necessary part of telephony. It was the next logical step.



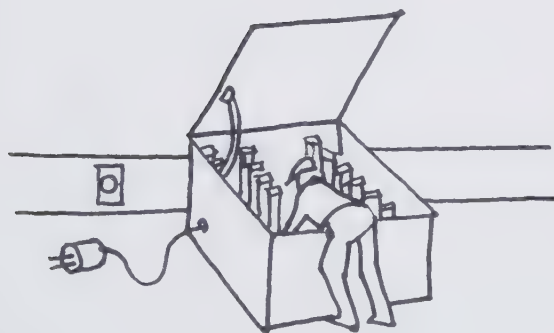
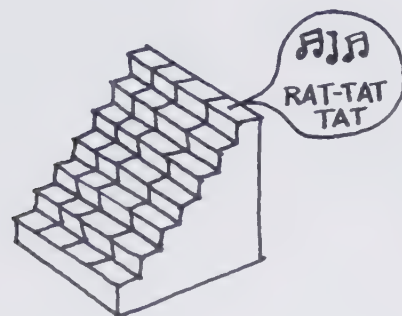
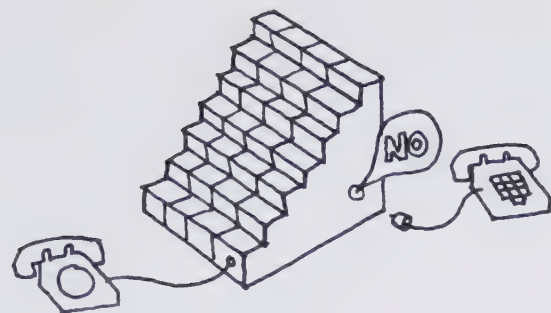
On the surface, it would seem that an automatic switching system has a relatively simple job to perform. All it has to do is recognize that one subscriber wants to be connected to another, make the necessary connection according to the subscriber's dialled information, ring the called party, and so on. Of course, if service is going to be comparable to operator switching, all this must be done in a few seconds. It sounds easy, but in fact an automatic switching system needs considerable intelligence.

The first automatic switching system introduced in North America, and still very widely used, is called step-by-step. As the name implies, connection between telephones is set up in steps or stages, under direct control of the subscriber's telephone dial. This is an example of how it works:

- a. Suppose you wish to call someone whose telephone number is 828-2761, from a telephone in the same exchange.
- b. You begin by lifting your telephone handset. At the central office, a special device called a line finder detects your request for service, connects you to the first of seven switches and returns a dial tone to signify that the switching system is ready for you to dial.
- c. As you dial the first '8' in the number, the first switch will 'step' to the 8th position, then find an idle path to the next switch in the train in time to receive the second digit you dial (2) and so on, until the entire telephone number has been dialled through a train of seven switches.
- d. If the called line is busy, the last switch sends back a busy signal; if it is idle, ringing is applied to the line.
- e. When the called party answers, ringing is cut off and a talking connection is switched through.

The step-by-step system still does its primary job, setting up connections between any two telephones, well. However, it does have some limitations and disadvantages:

1. A great deal of switching equipment is tied up for the duration of a call.



2. It is wired to do exactly as it is told, and cannot extend beyond the scope of setting up a simple connection under the direct control of a rotary dial. If more sophisticated services, such as pushbutton dialling, are required, very expensive modification of the equipment is necessary. The step-by-step system is simply incapable of meeting the expanding requirements of the telephone business economically.

3. Its continuous 'rat-tat-tat' (stepping pulses) makes it unsuitable for data transmission—an increasingly important aspect of the telephone industry.

4. It requires a lot of labour, both for initial installation and modification to meet changes in customer needs.

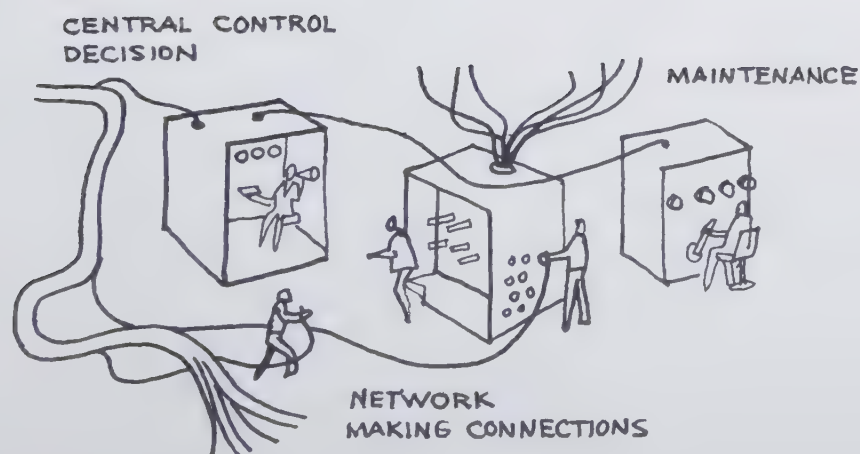
Now, if step-by-step systems have all of those disadvantages, what are the alternatives? Well, the next stage in the evolution was common control, of which crossbar systems are most typical in North America.

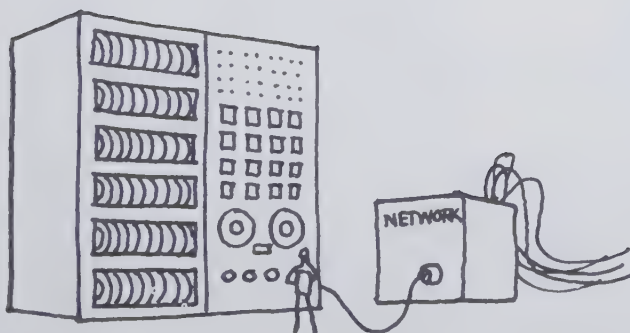
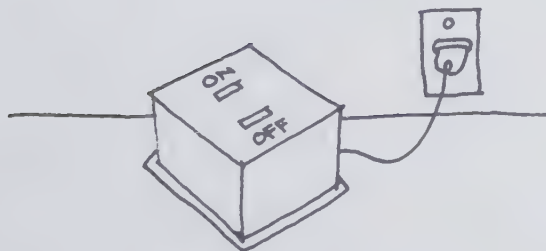
The basic idea behind common control is to separate the function of making connections, which we label the network, from the function of decision making, which we call control. And, because the control function is required during only part of the telephone connection process, it makes sense to put all of the control equipment in a common pool in the interest of efficiency, and hence cost.

A significant advantage of common control or crossbar systems is that the switches are no longer under direct control of the dial. The dialling information is received by the common control equipment, interpreted and analyzed before the connection is set up. This provides the capability of adapting to special requirements such as pushbutton dialling. The only real limitation is in the amount of intelligence or information that can be wired into the common control equipment.

Another obvious advantage is in the network (switches). With the crossbar switch there is no more 'rat-tat-tat', and no more heavy wear and maintenance.

Crossbar systems used in North America have another very important feature—centralized testing and trouble detection. For the first time, maintenance personnel are made aware of troubles in the switching system and its connecting lines as they occur. Quick remedial action can be taken, quite often even before subscribers are aware that there is trouble. This means better service, fewer complaints and lower costs.





Crossbar systems were a giant step forward, in better service, reduced maintenance costs and greater adaptability to change. They were so enthusiastically received by North American telephone companies that there are thousands of such systems in service today.

Had we reached Utopia in switching systems with crossbar? Not quite.

In spite of its many improvements over step-by-step, crossbar is still a labour-intensive system. Its common control equipment could be likened to a large electromechanical computer programmed to do many things. However, because everything is 'wired down', it requires a great deal of labour to change its operating instructions. Also, every central office switching system is engineered to meet a specific set of circumstances, so crossbar systems tend to be custom made. This has a distinctly undesirable effect on manufacturing and installation costs.

Because of the growing importance of labour costs, the time was again ripe for a new concept in switching systems—a concept that would build on the common control experience gained in crossbar systems and at the same time overcome the disadvantages of wired-in control. Enter electronic switching, the 'today' part of our story.

The kind of electronic switching system we are going to talk about here is called 'stored program control'. It's an extension of the common control concept used in crossbar systems, in that it attempts to concentrate practically all of the intelligence required for a switching system in a special purpose digital computer which acts according to instructions stored in a magnetic memory. This set of instructions is called the 'program', and is often referred to as 'software' as opposed to the 'hardware' that it controls.

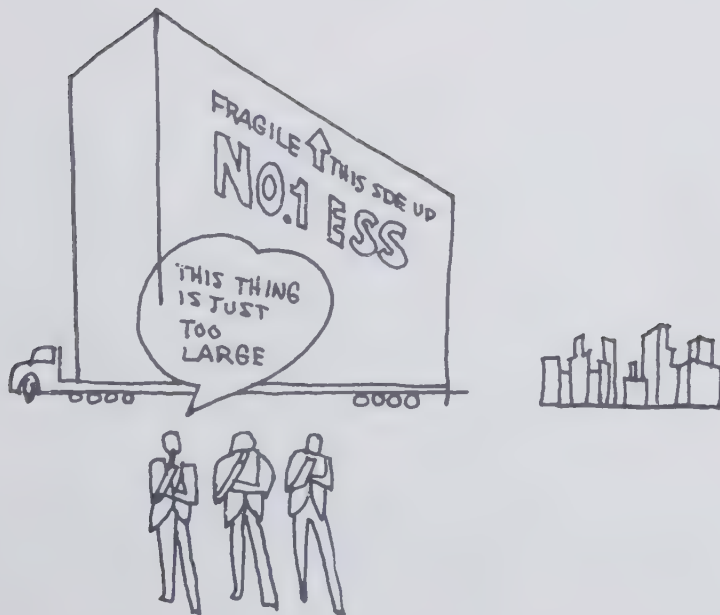
Stored program electronic switching is an enormous advance in telephone systems. It permits almost identical equipment to perform a whole range of functions without rewiring, and thus overcomes the main deficiency of previous systems, both step-by-step and crossbar. In addition, it opens the way to many very important features never before available, because a stored program switching system has many of the properties of a powerful computer.

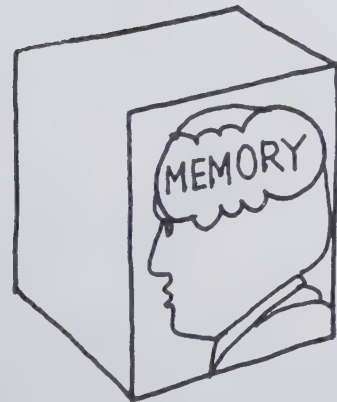
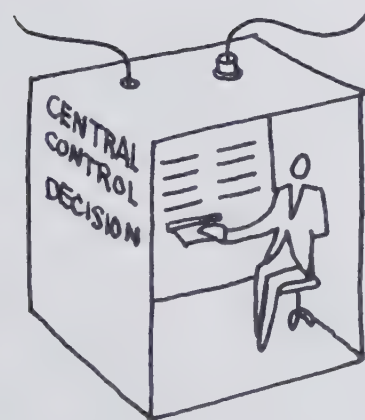


Bell Laboratories designed the world's first successful stored program switching system, No. 1 ESS, and it was introduced into service in 1965. Bell Canada quickly recognized the advantages of No. 1 ESS. Northern Electric, as Bell Canada's communications supplier, was asked to provide an initial installation of No. 1 ESS in Montreal for Expo 67. To do this, Northern Electric had to learn the principles of No. 1 ESS and how to manufacture it. The Montreal installation was successful, and to date Northern Electric has manufactured fourteen No. 1 ESS offices for Bell Canada and one for the New Brunswick Telephone Company.

Bell Canada and Northern Electric were quite aware, as they planned their first electronic system, that No. 1 ESS would be unable to meet the full size range of switching requirements. It was designed for large installations and would not be economical for small ones. Feasibility studies began at Bell-Northern Research and Bell Canada for a new electronic switching system which would bring the advantages of stored program control to smaller switching centres at a cost comparable to that of existing crossbar systems. They recommended that Northern Electric develop a switching system in accordance with the following precepts:

- it would be based on the concept of stored program control;
- the new system would be economical in small to medium applications, but capable of being expanded for large installations;
- there would be a family of switching systems, using essentially the same hardware to adapt to various requirements: local switching service, long distance, special residential and business services, special operator services, data switching, and as many others as required;
- it should be a simple, economical system to manufacture, install and maintain.





The result of this study, done in 1964, was the SP-1 stored program control electronic switching system. The first SP-1 went into service in Aylmer, Quebec, just 7 years later—on schedule, and living up to the planned objectives.

Because of the proven ruggedness and reliability of crossbar, and because of long experience with it, a switch of the crossbar type was chosen for the SP-1 system. However, compactness was an important factor in the design of a new generation of electronic switching machines, so a new crossbar switch, less than half the size of previous ones, was designed at Bell-Northern Research. Called the Minibar* switch, it was half the size, but had fifteen times the reliability—reliability now established by several years of laboratory and in-service testing.

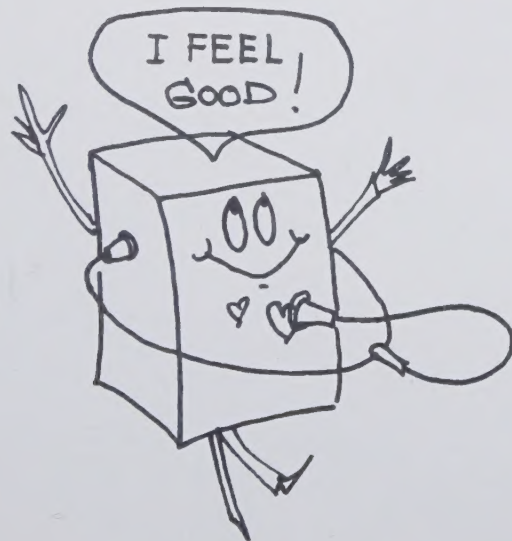
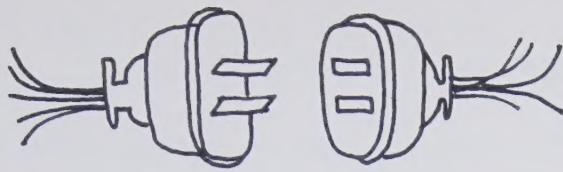
The main equipment elements of the network frames, which make the actual connections in the SP-1 system, are the Minibar switches and wire spring relays. The wire spring relay has been the heart of Northern Electric's crossbar systems for almost 15 years, and is the workhorse for those circuits in SP-1 which do not require electronic speeds.

But the SP-1 is not called an electronic switching system because of its Minibar switches and wire spring relays. Obviously. The real secret of the system lies in its electronics—the special purpose computer, the memories and the associated stored program that directs its operation. Circuit elements must operate in billionths of a second—a far cry from the Minibar which operates in thousandths of a second. To fulfill this key role of electronics, Bell-Northern Research worked closely with a sister company, Microsystems International, to develop a family of integrated circuits that would meet the demanding requirements of high speed, low cost and high reliability.

Up to 40 of these integrated circuits are mounted on printed circuit cards, which are in turn mounted in equipment frames such as the central processor, or special purpose computer.

Also in the central processing unit are the memory banks, which contain all instructions for control of the system, as well as pertinent data on subscribers' lines and central office equipment. These instructions can be written into memory in a matter of minutes from a magnetic tape. The memories used in the SP-1 system are called 'piggy back twistors'. They were developed by Bell Laboratories in the

*Trademark of Northern Electric Company, Limited



United States, and are similar in technology to the memories used in the No. 1 ESS. They were the most suitable memories available, and were consistent with Northern Electric's previous manufacturing experience. They have proved to be a good choice.

Most of the equipment frames of the SP-1 system are equipped for plugging together on site. This is a very important feature in two ways: it eliminates errors in installation by permitting factory testing before shipment, and it simplifies and shortens the installation job. The net effect is a significant reduction in cost for both manufacturer and telephone company.

Another major factor in controlling the overall cost of a switching system is equipment simplicity. And simplicity of equipment means flexibility. Because the intelligence of the SP-1 system is vested almost entirely in the stored program (software), there is no need to customize the equipment for each installation. The equipment is essentially the same for all jobs, and so can be planned for efficient manufacture. Initial and subsequent installation is fast and simple, because no special wiring or rewiring are necessary. The designers of the system have therefore responded to the manufacturer's need to control costs without compromising quality.

Lower cost to the manufacturer is, of course, passed along as a lower price, but equal efforts were applied to lowering the day-to-day cost of the system to the operating company. The most important factor in this area is reliability. The SP-1 system is designed for a maximum 'service outage' of only two hours in forty years of operation, made possible by extremely reliable components, duplication of central control, and automatic diagnosis of trouble.

Closely coupled to reliability is low operating cost, in both maintenance and administration. That is why the centre of operations, called the maintenance centre, is such a vital part of an SP-1 installation. It is the principal interface between man and machine. A very personal interface.

As opposed to the one-way conversation of crossbar systems, man and machine actually talk to each other through the teletypewriter. The man asks the questions and the machine answers. The machine itself continually communicates the state of its health, where it is having trouble (if it is), how hard it is working, and, in general, all the things that maintenance people need to know to maintain superb service at low cost. SP-1 can talk, from a considerable distance, typically, to a centralized service centre, a service order clerk or a traffic administrator.



Furthermore, this system requires only half the space of comparable crossbar systems, resulting in a significant saving in building costs.

However, the design of the SP-1 switching system will not stand still; when new technology offers a way to do today's job at lower cost, or a better job at about the same cost, we will take a serious look at it. For example, work has now been completed on a solid state memory to replace the piggy back twistor. Recent advances in solid state technology offered an opportunity to reduce the cost of memories and, at the same time, improve the memory capacity of the system. That is exactly what we did.

Just as we are introducing new technology into the SP-1 system, the family concept allows us to update the system continually with new features and to introduce new members into the family as the need arises.

